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THE ESSENTIALS OF A GOOD CENSUS*

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A meeting of the American Statistical Association held on the eve of the taking of the Fourteenth Decennial Census of the United States seems to offer a peculiarly appropriate time and occasion for considering the subject of this paper. For the coming census will furnish the foundation for a large part of our statistical work for the next ten years; and if there is one hope that we as statisticians cherish more than any other, it is that we may obtain a good census. To forestall a possible misunderstanding, it may be well to say at the outset that the question which I am going to consider in this connection is not primarily what must be done in order to obtain such a census, but rather what are those features or characteristics which a census must possess before we can pronounce it good. To this question the most probable answer, I imagine, would be that a good census is one which is accurate and complete; and no one certainly will deny that accuracy is a primary essential. But it is not all that is needed to make a good census.

It might be said that accuracy in a census is something like honesty in a confidential employee. No other qualities, however excellent, will compensate for the lack of it, but while essential it is hardly sufficient. Regarding the importance of accuracy, there is in fact no room for differences of opinion. The only question in this connection that might be open to discussion, but one which I shall not stop to consider, is just how accurate a census must be to fulfil the requirements of a good census; for we all recognize that absolute accuracy

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in a census is neither possible nor, fortunately, necessary, a certain margin of error being permissible as well as inevitable even in the best of censuses.

Taking accuracy for granted, however, what are the other features of a good census? The taxpayer might suggest economy; and it is unquestionably of great importance that a census be economically conducted even though waste or extravagance may not impair the value of the finished product. One may well be disposed to view the increasing cost of the census with some dismay. The First Census, that of 1790, was little more than a count of population—a very rudimentary census, we should now consider it, which cost the modest sum of $45,000. The census of 1850, which may be regarded as the first comprehensive census, covering in detail population, agriculture, and manufactures, as well as some other subjects, cost $1,400,000. The estimated cost of the Twelfth Census, taken 50 years later, in 1900, was nine times that amount, or $12,500,000.* The Thirteenth Census cost approximately $16,000,000. Of course some part of this great increase in the cost of census-taking was a natural and inevitable result of the growth of the country in population and resources. But that it was mainly due to the expansion of the census as regards the number of subjects covered and the greater elaborateness of the tabulation is evidenced by the fact that the per capita cost, as well as the aggregate cost, has greatly increased. The primitive census of 1790 could have been paid for by a contribution of one cent from every person enumerated. By 1850 the per capita cost had increased to 6 cents. It showed no appreciable advance in 1860, but reached 8½ cents in 1870, 11½ in 1880, and 18 in 1890. That was the maximum. But the reduction to 16 cents at the next census, that of 1900, is fully accounted for by the fact that the decennial census had been relieved of a number of statistical inquiries which previously had been attached to it, but were now either dropped altogether, as was the case with the mortgage investigation, or deferred until the main census was completed. So as a result of this readjustment certain inquiries which were formerly chargeable

* *Report of the Director of the Census*, 1907–8, p. 31.

to the decennial census are now charged to the permanent or intercensal work of the Census Bureau. This readjustment having been effected, the cost of the census resumed its upward course, the per capita in 1910 being 17 cents, as compared with 16 in 1900; and beyond a doubt the census now being taken will cost much more than the census of 1910 for those reasons which make the costs of any enterprise or undertaking and also the costs of living so much greater at the present time than ten years ago.

The great increase in the cost of the census is easily paralleled by the increase in the cost of other governmental functions or activities; and it may be of interest to inquire whether the expenditure for the census expressed as a fraction of the total disbursements of the federal government is any larger now than it was formerly. As the census is taken only once in ten years, the comparison may appropriately be based on the total governmental disbursements for the ten-year period beginning with and including the census year. On this basis the census of 1850 represented a cost of about $248 per $100,000 paid out by the federal government during the ten fiscal years 1850 to 1859, inclusive. The corresponding figure for the census of 1880 was $222 per $100,000; that for the census of 1890 was $298; and that for the census of 1900, $229. Before computing the ratio for 1910, we must take into consideration the fact that the government disbursements during the decade which began with that year and is now just completed include the enormous extraordinary expenditures for the war. For the purpose of a fair comparison I have, however, taken the disbursements for the first five years of the decade, or the years 1910 to 1914 inclusive, doubled this total, and accepted the result as indicating roughly what the expenditures of the government would have been under normal conditions. Comparison of this figure with the cost of the 1910 census gives a ratio of $239 per $100,000. The figures here presented indicate that the cost of the census has at any rate not mounted more rapidly than the general expenses of the government; and I venture the prediction that the cost of the 1920 census, whatever it may be, will represent a diminishing fraction of the total governmental disbursements. Before leaving

this phase of my subject, I may give myself the satisfaction of pointing out that these computations mean that out of every $100 paid out by the national government in the course of ten years, about 25 cents is set apart and expended for the census.

These figures are of interest in aiding one to view the cost of the census in its proper perspective. But, of course, they prove nothing regarding the question of whether the cost is justified. An expenditure of $20,000,000 (and the current census will cost more than that) is no trifling sum, no matter how small a fraction it may be of the total expenses of the government, or how small a quotient may result when we use as a divisor the total population of the United States. I take it for granted, however, that the census of the United States is worth twenty millions provided we cannot get it for less. In other words, the census cannot be said to cost too much unless it can be shown that the cost is more than is necessary and that a census equally comprehensive might be taken for less money.

To what limit the cost might mount before reaching the point where we should feel obliged to forego the census or reduce it to a mere count of population required by the Constitution or otherwise materially curtail it, it would be idle to inquire. We may rest assured, I think, that the American people in general, as well as the statisticians and economists, will insist on perpetuating the census. But that does not make it any less essential that the census should be economically and efficiently conducted; and economy is quite as important from the standpoint of the statistician or the user of statistics as from that of the taxpayer. For the less the census costs the easier it will be to extend and improve the statistical work of the federal government; the easier it will be to obtain, for instance, authorization and an appropriation for a quinquennial census of population and agriculture, or an annual census of production, or an adequate compilation of statistics of crime, not to mention other statistical inquiries not yet authorized but greatly needed. In general, the improvement and extension of statistical investigation are conditioned upon economy and efficiency in the organization and

conduct of the work of gathering and compiling the basic statistical data.

The introduction of electrical machinery has, as is well known, effected a very great economy in the tabulation of census data. This, however, has been manifested not in any reduction of expenditure, but in a greater output in proportion to expenditure. With the aid of the electrical tabulating machinery we are doing things today that we could not think of attempting if the tabulation had to be carried on by hand, as was the case 60 years ago. Here, as in other fields, the introduction of labor saving machinery has not reduced employment, but has resulted in increased production.

No corresponding advance or improvement has been made in the method or process of collecting the basic data, or in other words, the field work; and the field work in 1910 cost over $7,000,000, representing 45 per cent of the total cost of the census. The compensation of enumerators alone aggregated $4,784,000, which represents about 30 per cent, or nearly one-third, of the total cost. The method of taking the census or of obtaining and recording the basic data is essentially the same as it has been for the last fifty years or more. The enumerator or census-taker makes a house to house canvass of his district, addresses the questions orally to the inhabitants, and enters the answers with pen and ink on a sheet schedule, having one line for each individual enumerated. It is doubtful whether any improvement over this process can be devised which will result in any material economy. The distribution of advance schedules or lists of questions to be filled out by the inhabitants before the enumerator calls, a procedure which was followed to some extent at the census of 1910, probably insures greater accuracy, but results in no appreciable saving of expense. The use of a punch card by the enumerator has been considered and tried out to a limited extent, but has not yet proved to be a success. The card punched in the field cannot be used for tabulation in the office. For the latter purpose a more perfect card of a smaller size is necessary and the punching must be done with greater precision than is possible in using a hand punch. There are other drawbacks to the use of a punch card from the standpoint of econ-

omy, and it is also a question what the effect would be upon the accuracy of the returns. Still it is possible that the punch card may be used by the enumerator at another census.

Economy, however, does not necessarily involve a reduction of expenses. It may be manifested in obtaining a better service at the same cost or even at an increased cost; and with regard to the field work of the United States census the most important problem is not, I believe, that of reducing expenses so much as that of improving the quality of the enumeration, in the direction of greater accuracy, completeness, and reliability. If we are to continue to take the census by the method now followed, the main problem is that of securing a good class of enumerators and placing them under efficient inspection and supervision. One obvious way of obtaining better enumerators is to increase their compensation. The enumerator is employed for about two weeks in the cities and about one month in the rural districts. The average compensation of the enumerators in 1910 was about $70. It will be more than that this time, but the increase probably will not be so great as that which has taken place in the general scale of wages since the last census. To increase the enumerator's pay, however, is seen to be an expensive method of improving the census when we reflect that an addition of $10.00 to the average pay of the enumerator means an increase of almost $1,000,000 in the total cost. Is there any other effective appeal than that to the pocketbook? Can we educate the public to regard the taking of the census as a public service, in which the individual is called upon to assist as a matter of public duty justifying and demanding some degree of sacrifice on his part? We remember in this connection the voluntary and uncompensated services which the citizens of this country cheerfully performed in connection with the draft. Can we successfully appeal to the same motives of patriotism in calling for assistance in taking the census? Probably not. The average American, I think, is decidedly of the opinion that a government which is collecting more than $5,000,000,000 of revenue annually can afford and ought to pay for any peace-time services which it may require from its citizens.

If any material improvements in the field work of the census either in the direction of greater economy or greater accuracy are possible, they must come through better organization and greater efficiency rather than through reduced pay or volunteer services. So far as the present census is concerned, however, the question is purely academic; but it may be well worth thinking about in the course of the next ten years.

Taking accuracy for granted and having achieved economy, what are the other requisites of a good census? One, I should say, is expedition. A census is not a good census unless it is taken and completed promptly. But promptness, like accuracy, is relative or approximate. No census can ever be strictly up-to-date in the sense of representing exactly the conditions existing at the time the census is published. A certain period necessarily elapses between the date to which the census relates and the date of publication, and in that interval conditions change to some extent at least, so that if, as has been said, the census is a snapshot of the population and resources of the United States, we must recognize the fact that some little time is needed for the development of the plate. But the time spent in the dark room should not be unduly or unnecessarily prolonged, nor, I will add, unduly curtailed at the cost of marring the picture by underdevelopment. Opinions may differ as to the period within which a census ought to be completed and published, and the question when a census can be said to be completed is also open to discussion, as there are varying degrees of completeness. But with regard to the census of the United States, the former question has been authoritatively settled by legislation, the law prescribing the period of time within which the census reports shall be completed. It must be assumed that the period is a fair and reasonable one. Therefore, one requisite of a good census in the United States is that it should be completed and published within the period of time prescribed by the law.

The statutory limitation of the period within which the census must be completed was first introduced in the act providing for the Twelfth Census, or the census of 1900. The need of some such limitation was probably suggested and emphasized by the length of time it had taken to get out the

reports of the previous censuses. Most of the main reports of the census of 1880 were not issued until near the end of the year 1883, although the population volume and the two-volume compendium appeared in the early months of that year. In the case of the census of 1890, there was even greater delay; none of the main reports was issued much before the close of the year 1894, while the second population volume, containing the occupation statistics, did not appear until 1897.

In this matter of expedition the Twelfth Census, taken in 1900, made a good record; and yet the claim that it practically complied with the new requirement of the law limiting the period within which the reports must be issued is not fully justified. It is true that on July 1, 1902, the date of the termination of the census period, three of the ten main volumes had been published, and six more had been released for printing; these appeared within the next two months, and the remaining volume was published the following October. But the Abstract was not issued until January, 1903, and the Statistical Atlas not until October of that year; the special Occupation Report, which was virtually as much a part of the Twelfth Census reports as any of the numbered volumes, did not appear until June, 1904, practically two years after the termination of the period within which the reports of the Twelfth Census were by law to have been published. In fact, the permanent force of the census office was largely employed in finishing the Twelfth Census work for more than a year after the termination of the census period.*

The Thirteenth Census, judged by any criterion except that of expedition, can, I think, be termed a good census, on the whole the best that was ever produced. But in the matter of expedition it was a sad failure. At the termination of the census period, not one of the main volumes had been issued, and of six series of state bulletins only three had been completed, the publication of the other three having hardly been begun. The first main volume to appear was issued in December, 1912, six months after the termination of the Thirteenth Census period as defined by law. The Abstract

* *Report of the Director of the Census*, 1907–8, p. 30.

appeared in February, 1913, and the other volumes at intervals throughout that year, with the exception of the general report on population, which went over into the next year, appearing on January 5, 1914, and the occupation volume, which was not issued until July, 1914.

But to revert to the other question previously suggested, when can it be said that a census is completed? If not until all the basic data obtained have been duly tabulated and adequately exploited, then it can hardly be said that any census has ever been completed. Indeed every census, at least since that of 1850, has contained questions which have never been tabulated at all. I am referring now to the main census subjects. I am not considering the various secondary investigations which were formerly tied up with the main census and which included numerous interrogatories that never bore any statistical fruit.

The most striking recent instance of the neglect or failure to utilize all the available data obtained through the census is afforded by the question asking the number of children borne by each mother and the number still living at the date of the census,—a question which appeared on the population schedule in 1890, 1900, and 1910, but remained unutilized with the single exception that some of the 1900 data covering a few small selected areas were tabulated by the Immigration Commission and published in its reports.

The question of completeness, as I have said, is one of degree. It is not merely a question of making some use of every class of data on the schedules. It would be possible to tabulate the answers to every question and still have a census which would rightly be considered very deficient. We might, for instance, show ages for the total population only, without any distinction as to sex, color, or nativity; or show occupations without any age or sex distinctions. We might present a given classification for states only and not for cities, or for states and cities but not for counties. The question of completeness is thus a question of elaboration, of cross classification, or correlation, of detail.

The possibilities of detail and of elaboration in tabulating the results of the census are almost infinite. But it must be

assumed, I think, that when Congress in the law providing for the Twelfth Census prescribed the period within which the census reports must be completed and published, it had in mind the established standard; or in other words, it had in mind reports having about the same scope and detail as those published in connection with the censuses of 1880 and 1890. The Bureau of the Census at any rate cannot undertake to do more than that within the census period; and it will do well if it does that.

But is it necessary to stop there? Will the census office be debarred from making any further study or use of the Fourteenth Census data by this requirement of the law that the reports upon the inquiries shall be completed and published before July 1, 1922? When that date arrives and the main census reports have happily been completed and published, must the schedules be relegated to the dust of storage to be referred to only when some one for a good and legitimate reason affecting, perhaps, property interests, wants to know whether John Smith of Smithville was a married man in 1920? It is one feature of a good census, surely, that the data obtained by it at such great expense should be fully utilized, exploited, and interpreted, or, in other words, that we get out of the census all that there is in it. Otherwise we fail to realize on our investment.

I obviously am assuming that the data on the original schedules are *not* adequately exploited when the main reports are issued. Experience justifies that assumption. I have already called attention to the fact that at every census certain questions on the schedules have been entirely neglected; but quite aside from this, the need and opportunity for further tabulations have been made evident regarding questions or classes of data which were not entirely neglected, but were covered in a general way by the main reports. For instance, the preparation of the Twelfth Census report on occupations involved a further tabulation of census data after the main reports were completed. This is also true of the special reports on Women at Work and on Child Labor. The Supplementary Analysis does not belong in quite the same class because it was simply a study, analysis, and reclassifica-

tion of statistics already published in the main reports, and did not involve the utilization of any unpublished data. The statistics used as the basis of this work were, therefore, available to any one who wished to make use of them. Nevertheless, it is safe to say that no private individual, and probably no institution other than the census office, could have undertaken the work involved in the preparation of that volume. It required the equipment of an organized statistical office supported by the resources of the federal Treasury.

Another illustration of the fact that the census data are only partially exploited in the main reports is afforded by the plan which was considered at both the Twelfth and the Thirteenth Census for a tabulation of data relating to the family. In the main census reports, the unit is the individual. No facts are shown regarding the family beyond the mere number of families, classified by size and by the tenure of their homes. In the projected report, all the significant census facts regarding the family, such as the occupation of the head of the family, the number of children—the number at school and the number at work—the presence or absence of boarders or lodgers, were to have been tabulated. At the Twelfth Census cards were actually punched for the family tabulation.*

It is by no means always necessary to go back to the original schedules to find new and interesting information not contained in the main reports of the census. Frequently it is a question simply of another run of the punched cards through the tabulating machines. Suppose, for instance, that it is desirable—as I think it is—that the facts regarding sex, age, marital condition, illiteracy, and ability to speak English should be shown not merely for the foreign born population as a whole, as is done in the main reports of the census, but for each foreign nationality separately, the Germans, the Irish, the Italians, the Swedes, etc. Another run of the cards would furnish this information. It is fairly evident, then, that the data obtained by a decennial census cannot be fully exploited or adequately analyzed and presented within the period of a little over two years allowed by law for the completion of the

* *Report of the Director of the Census to the Secretary of the Interior*, 1903, p. 5; *cf.* also *Report of the Director to the Secretary of Commerce and Labor*, 1903–4, p. 4.

reports. That, as Director North truthfully said in his first report following the termination of the Twelfth Census period, is physically impossible. Either the data must be abandoned or buried when only partially utilized, or we must continue the tabulation, study, and analysis of the census after the census period has terminated. I can, I think, take for granted that the audience I am addressing would advocate the second of these alternatives; and the census office since it became permanent has, in fact, as I have already pointed out, supplemented the main reports by special reports or studies prepared and published after the termination of the census period. But it has never done all that it has planned to do in this direction, has never, in my opinion, planned to do as much as should be done, and has felt compelled to apologize more or less for doing as much as it has done, the apology being intended to forestall criticism for issuing delayed reports and publishing figures alleged to be out of date. It is highly desirable that the further exploitation of the census data be continued after the termination of the census period as defined by law, and that the public should be brought to appreciate the importance of this work, as it would be, I think, if in accordance with the recommendations of the Census Advisory Committee representing this association, a series of supplementary census studies, wisely planned and carefully prepared, were published soon after the completion of the current census.

THE MORTALITY OF RACE STOCKS IN PENNSYLVANIA AND NEW YORK, 1910

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The United States offers an especially good opportunity to the demographer to study the comparative mortality of the principal European race stocks. In this country, a considerable proportion of the population is of foreign origin and the several races live together in close proximity in the large centers on the Eastern seaboard. The presence of these people in ever increasing numbers has undoubtedly had its effect in modifying the demography of the country. A study of the statistics, with due regard to race stocks, should show just what the effect of this immigration has been on the total mortality of the country. It is quite possible that certain disquieting features of the mortality in recent years, such as the increasing death rates after age 45, may be due largely to such immigration. Such study should, furthermore, throw considerable light on a question that is of great interest to the social economist, namely, whether residence in the United States has had any effect, favorable or otherwise, on the mortality of these race stocks since their arrival.

It was with such purposes in mind that one of the writers, several years ago, carried out an investigation* of the mortality of the more important races living in the state of New York. The results showed very clearly that the foreign stock suffered appreciably higher death rates than the native stock, that is, those of native parentage. Among the immigrant peoples, considerable diversity was found. The Russians, who are mostly Jews in New York State, and the Italians, showed remarkably low death rates, while persons of Irish and German birth suffered from very high death rates, and especially from pulmonary tuberculosis and the so-called degenerative diseases.

The results of this investigation were of such interest and significance that it has seemed desirable to amplify the study

* Dublin, Louis I., "Factors in American Mortality," *American Economic Review*, Vol. VI, No. 3, September, 1916.

of the problem by subjecting additional data to a similar analysis. Through the courtesy of the Director of the Census, Hon. Sam L. Rogers, to whom our thanks are due, it has been possible to obtain the necessary basic material for the state of Pennsylvania. This is a large industrial state with a high proportion of foreign stock. The absolute numbers of the foreign born are also large enough to warrant an analysis by the items of country of birth, age and sex. This paper will present the new facts in comparison with those previously published for New York State and will restate the combined results in the light of the additional evidence. We may note at this point that the findings in the two states completely confirm each other and remove all doubt as to the reliability of the earlier study.

The first table presents the structure of the population of Pennsylvania and New York with reference to nativity. Distinction is made between the native born by parentage and the foreign born by country of birth. It is possible to differentiate in the last group the following nationalities: Austro-Hungarians, Russians, Italians, Germans, British, and Irish; these are arranged in a descending order according to their

TABLE I

NUMBER AND PERCENTAGE DISTRIBUTION: (A) OF TOTAL WHITE POPULATION BY NATIVITY, PARENTAGE OF NATIVE BORN, AND COUNTRY OF BIRTH OF FOREIGN BORN; AND (B) OF TOTAL WHITE FOREIGN BORN, BY COUNTRY OF BIRTH. PENNSYLVANIA AND NEW YORK STATE, 1910

Population class	Pennsylvania			New York		
	(A)		(B)	(A)		(B)
Total white population	7,467,713	100.0	....	8,966,845	100.0	....
Native born	6,028,994	80.7	....	6,237,573	69.6	....
Native parentage	4,222,727	56.5	....	3,230,325	36.0	....
Foreign, mixed parentage	1,806,267	24.2	....	3,007,248	33.5	....
Foreign born	1,438,719	19.3	100.0	2,729,272	30.4	100.0
Austria-Hungary	375,271	5.0	26.1	341,836	3.8	12.5
Russia	240,980	3.2	16.7	558,952	6.2	20.5
Italy	196,122	2.6	13.6	472,192	5.3	17.3
Germany	195,185	2.6	13.6	436,874	4.9	16.0
Great Britain	170,356	2.3	11.8	193,359	2.2	7.1
Ireland	165,091	2.2	11.5	367,877	4.1	13.5
Other foreign born	95,714	1.3	6.7	358,182	4.0	13.1

proportionate representation in the population of Pennsylvania at the time of the 1910 census.

It is understood that the several designations of country of origin of the foreign born are not always indicative of race stocks, since a few countries include a number of different races. This is especially true of Austria-Hungary and Russia. As we shall see later, the composition of these groups is also somewhat different in Pennsylvania and New York.

We find in Pennsylvania that these six foreign groups together comprised 18.0 per cent of the total white population in 1910 and 93.3 per cent of all the foreign born; in New York, they constituted 26.4 per cent of the total white population and 86.9 per cent of all the foreign born. In these two states, accordingly, the foreign populations are sufficiently large to justify careful study in comparison with one another and with the native elements of the population.

The first step will be to compare the specific death rates in the states of Pennsylvania and New York of (A) the native born of native parentage, (B) the native born of foreign or mixed parentage, and (C) the foreign born. Table II presents the facts for each sex and by age periods.

An observation should be made before the figures for these three classes of the white population are compared. The foreign born are but lightly represented at the ages 1, 2, and 3 years, at which periods mortality rates are high. Lacking this component, the death rates for the foreign born under age 10 are not comparable with those of the other two groups of the population, which include a normal proportion at these earliest ages. Beginning with age 10, however, the figures for the three groups are comparable for all practical purposes.

The figures for both states are remarkably similar and bear out the following observations. At ages 10 to 19, the death rates are much the same for the three classes, with the single exception of the foreign born males, ages 15–19, in Pennsylvania, whose very high death rate is undoubtedly due to occupational hazards. But, beginning with age 20 and continuing throughout the rest of life, the rates for the native born of native parentage are decidedly the lowest of the three groups, the only exception being among the foreign born females in New

TABLE II

DEATHS PER 1,000 WHITE POPULATION AMONG (A) NATIVE BORN OF NATIVE PARENTAGE, (B) NATIVE BORN OF FOREIGN OR MIXED PARENTAGE, AND (C) FOREIGN BORN, BY SEX AND AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910*

Sex and age	Pennsylvania			New York		
	(A) *NB, NP*	(B) *NB, FMP*	(C) *FB*	(A) *NB, NP*	(B) *NB, FMP*	(C) *FB*
MALES						
All ages: Crude rate	14.2	21.2	16.4	15.9	18.7	17.2
Ages 10 and over: Crude rate	11.5	12.6	16.5	13.8	13.2	17.5
Standardised†	12.8	18.8	17.5	13.8	19.5	17.3
Under 10	22.6	38.2	11.5	23.5	31.0	8.4
10–14	2.3	2.6	2.6	2.5	2.2	2.5
15–19	3.3	4.1	6.1	3.6	4.1	4.4
20–24	4.9	6.2	7.3	5.0	6.8	5.2
25–44	6.2	12.3	9.1	6.9	14.3	8.7
45–64	16.8	25.7	25.9	18.8	28.2	28.0
65–84	75.2	91.4	91.5	77.3	89.9	90.4
85 and over	253.0	476.5	279.4	268.9	323.0	272.7
FEMALES						
All ages: Crude rate	12.7	17.3	16.7	13.9	14.7	16.3
Ages 10 and over: Crude rate	10.9	10.0	16.9	12.4	9.7	16.6
Standardised†	12.3	16.3	16.0	12.4	15.5	16.2
Under 10	18.6	32.6	10.8	19.6	27.0	8.2
10–14	2.3	2.2	2.2	2.6	2.1	2.4
15–19	3.3	3.1	3.7	3.2	3.2	3.2
20–24	4.2	5.4	5.0	4.7	5.2	4.0
25–44	5.8	8.5	7.4	5.7	9.3	7.3
45–64	14.4	18.1	21.4	14.3	20.0	23.4
65–84	66.6	86.0	86.7	68.2	73.9	87.7
85 and over	253.8	445.3	276.6	242.3	324.9	270.5

* Deaths in unspecified parentage and nativity groups distributed *pro rata* among specified nativity and parentage classes.

† Standardized for age distribution on basis of native born of native parentage, each sex, in New York State, 1910.

York, ages 20–24. The advantage of the native stock becomes greater with advancing age. A comparison of the two branches of the foreign stock shows a remarkable similarity in the death rates from age 10 onward. The one striking exception is at the ages 25–44, during which period the foreign born males have very much lower death rates than the native born of foreign parentage. The causes for this difference will be made evident later.

Perhaps the best single measure of the comparative mortality of the three classes is found in the standardized rates for the ages 10 and over. In this rate, the figures under 10, which, as we have seen, are incomparable, are eliminated from consideration. It indicates the mortality which would result for the class in question if its age distribution were the same as that of the native born of native parentage in New York State —the base used for standardizing rates throughout this paper. When thus considered, the superior vitality of the native stock is fully demonstrated as to both sexes; but the superiority of the males is more striking than that of the females. The presence of the foreign stock has, therefore, had the undoubted effect of increasing the total death rate in both these states, especially after age 45 is attained. In Pennsylvania, this fact has increased the crude rate from 13.4 deaths per 1,000 to 15.6; and in New York, from 14.9 to 16.1.

In general, the respective rates for Pennsylvania are lower than those for New York. The only significant exception is in the case of the foreign born males at ages 15 to 44. We shall see later that this results from occupational hazards in mines and mills which are more serious in Pennsylvania than in New York.

We shall now resolve the death rates of the "foreign born," as given in columns (C) of Table II, into the rates for the various nationality groups. This will indicate how the several elements of the foreign born compare with one another, and which ones are responsible for the unfavorable mortality of the group as a whole. Unfortunately, it is at present impossible to compare each foreign born group with the native born group of corresponding parentage, *e. g.*, the Russian born with the native born of Russian parentage. We shall be compelled to consider each foreign born race in comparison with the native born of native parentage.

AUSTRO-HUNGARIANS

We shall consider first the Austro-Hungarians, one of the six groups which together make up the bulk of the foreign born in Pennsylvania and in New York. Immigration to America from Austria-Hungary has become important only since 1890, although in recent years the Austro-Hungarians have been

one of the most numerous components of our immigration. In 1910, there were 375,271 Austro-Hungarians in Pennsylvania, constituting 26.1 per cent. of the foreign born whites and 5.0 per cent. of the total white population. They find employment in great numbers in the mills and mines and in other coarse manual labor. In New York State in 1910, this element of the foreign born was not so large proportionately. There were 341,846 Austro-Hungarians in New York, which was 12.5 per cent. of the foreign born whites and 3.8 per cent. of the total white population.

This nationality is, of course, heterogeneous as to race stock, containing large proportions of Jews, Germans, Southern Slavs, and Poles.* In Pennsylvania, persons recorded as born in Austria-Hungary are largely Slovaks, Magyars, and Slovenians, while in New York a large portion of the Austro-Hungarians are Jews. Table III shows the death rates for Austro-Hungarians in Pennsylvania and New York, respectively, distinguished as to sex and age period.

The first two age periods must be disregarded because of the paucity of data. In Pennsylvania, we find that for each sex and at every age period from 15 to 64, the rates for Austro-Hungarians are much higher than for the natives. This same characteristic remains when the rates are standardized for age. In New York State, the rates for the two groups run nearly parallel to each other, with slight fluctuations in the various age periods. When standardized, the Austro-Hungarian rates are virtually the same as those for native stock. We shall see later that these differences in the two states are largely accounted for by the differences in the hazards of occupation.

The death rates for Austro-Hungarians in Pennsylvania and in New York may be compared with figures for corresponding groups in their native country. The facts are available for each of the two main divisions of the former Empire, Austria and Hungary, separately.† On the whole, the rates are higher

* Deaths of Poles given separately in census returns were distributed among Russians, Austro-Hungarians, and Germans, according to the percentages of all persons of Polish mother tongue in Pennsylvania and New York (census of 1910) who had come from the respective countries.

† *Annuaire International de Statistique:* I. Etat (pp. 55, 57), and II. Mouvement (pp. 80, 92) de la Population (Europe). La Hague, 1916–17.

TABLE III

DEATHS PER 1,000 WHITE POPULATION AMONG PERSONS BORN IN AUSTRIA-HUNGARY AND AMONG NATIVE BORN OF NATIVE PARENTAGE, BY SEX AND BY AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	Pennsylvania		New York	
	Native born of native parentage	Austro-Hungarian born	Native born of native parentage	Austro-Hungarian born
MALES				
All ages:				
Crude rate	14.2	9.7	15.9	9.3
Ages 10 and over:				
Crude rate	11.5	9.7	13.8	9.4
Standardized rate	12.8	14.4	13.8	14.3
Under 10	22.6	11.6	23.5	7.4
10–14	2.3	3.0	2.5	2.8
15–19	3.3	5.5	3.6	4.1
20–24	4.9	7.1	5.0	4.3
25–44	6.2	8.5	6.9	6.7
45–64	16.8	22.3	18.8	21.0
65–84	75.2	63.9	77.3	77.5
85 and over	253.0	181.8	268.9	301.6
FEMALES				
All ages:				
Crude rate	12.7	8.0	13.9	7.4
Ages 10 and over:				
Crude rate	10.9	7.7	12.4	7.3
Standardized rate	12.3	13.5	12.4	12.4
Under 10	18.6	12.3	19.6	8.2
10–14	2.3	1.7	2.6	1.6
15–19	3.3	4.0	3.2	2.0
20–24	4.2	5.9	4.7	3.5
25–44	5.8	7.1	5.7	5.8
45–64	14.4	16.7	14.3	18.2
65–84	66.6	75.5	68.2	63.9
85 and over	253.8	114.3	242.3	213.5

in Austria and in Hungary than among their emigrants living in this country. Thus, in the years 1908–13, males aged 25–44 had death rates of 8.8 and 8.9 per 1,000 in Austria and Hungary, respectively, as compared with 8.5 and 6.7 for Austro-Hungarians living in Pennsylvania and in New York; at ages 45–64, the corresponding rates were 24.2 for Austrians, 23.4 for Hungarians, and 22.3 and 21.0 for Austro-Hungarians in Pennsylvania and New York, respectively. The advantage of Austro-Hungarians in America is apparent, in spite of their occupational hazards which often result in death from accident, especially in Pennsylvania. The conditions are very similar for females.

TABLE IV

DEATH RATES OF WHITE PERSONS BORN IN THE UNITED STATES, FOR THE PRINCIPAL CAUSES OF DEATH, BY SEX AND BY AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	All causes		Tuberculosis of lungs		Cancer		Organic heart diseases		Pneumonia		Bright's disease		Violence excl. suicide	
	Rate per 1,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000	
	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.
MALES														
All ages	16.1	17.1	105.1	170.9	40.3	46.5	114.5	139.1	175.5	203.8	75.4	93.6	113.0	99.2
Under 10 ...	28.4	27.7	23.3	23.4	1.9	3.4	24.5	22.7	412.1	467.6	8.9	8.5	86.7	90.2
10–14	2.4	2.3	11.2	10.2	1.5	1.8	19.8	26.9	14.9	17.9	5.5	6.4	59.6	43.3
15–19	3.5	3.8	61.1	101.5	2.6	3.1	23.1	34.1	27.9	33.2	7.7	5.6	91.3	62.9
20–24	5.2	5.8	147.6	216.3	5.3	6.1	25.8	26.8	26.6	42.0	14.4	15.2	118.7	96.9
25–44	7.6	10.1	185.2	352.0	14.9	18.6	51.1	65.0	67.0	92.1	42.3	64.7	128.3	110.0
45–64	18.5	22.1	174.1	262.1	134.5	150.0	232.5	316.3	166.0	189.6	205.5	267.2	151.1	128.9
65–84	76.4	78.7	189.3	161.4	451.4	533.6	1472.7	1693.7	498.2	607.6	842.5	952.2	250.5	233.5
85 and over .	273.2	271.1	60.0	69.3	869.6	900.7	4377.8	4873.0	1739.1	1824.5	1919.0	2355.7	839.6	970.0
Unknown...	....	....	....	....	....	....	....	....	....	....	....	....	....	....
FEMALES														
All ages	14.0	14.3	98.8	109.6	72.8	81.0	106.4	123.3	143.4	168.1	62.7	78.1	37.9	34.9
Under 10 ...	23.8	23.7	19.1	20.6	2.8	2.2	22.7	20.9	333.1	396.6	7.8	7.4	64.9	55.1
10–14	2.2	2.3	19.3	27.1	1.8	2.7	26.4	29.8	16.0	20.3	8.0	7.4	11.4	10.6
15–19	3.2	3.2	91.5	111.5	2.6	3.9	21.7	25.5	14.0	22.4	8.6	8.8	14.0	11.5
20–24	4.5	4.9	162.3	186.3	1.4	4.0	22.1	29.1	20.3	21.7	16.1	15.4	12.5	15.1
25–44	6.5	7.4	172.8	193.3	41.4	50.9	47.7	61.8	35.9	54.2	38.5	59.2	13.2	14.5
45–64	15.2	16.6	108.9	111.1	251.0	287.4	220.8	247.1	119.4	130.3	155.9	208.6	29.0	28.8
65–84	68.7	68.7	178.7	137.9	649.1	668.4	1167.5	1369.3	607.8	683.4	606.9	680.9	193.9	193.8
85 and over .	271.3	248.2	100.9	32.6	827.1	896.2	3389.1	3992.2	2077.9	2362.7	1573.5	1694.6	1452.5	1319.9
Unknown...	....	....	....	....	....	....	....	....	....	....	....	....	....	....

TABLE V

DEATH RATES OF PERSONS BORN IN AUSTRIA-HUNGARY, FOR THE PRINCIPAL CAUSES OF DEATH, BY SEX AND BY AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	All causes		Tuberculosis of lungs		Cancer		Organic heart diseases		Pneumonia		Bright's disease		Violence excl. suicide	
	Rate per 1,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000	
	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.
MALES														
All ages	9.7	9.3	118.0	166.0	31.9	64.9	57.0	86.4	90.9	80.7	37.5	92.0	341.6	121.4
Under 10 ...	11.6	7.4	13.8	16.7	....	16.7	13.8	....	193.3	167.3	....	16.7	110.5	100.4
10–14	3.0	2.8	35.5	14.1	....	....	17.7	28.3	....	14.1	17.7	....	70.9	113.1
15–19	5.5	4.1	55.4	102.4	6.2	7.3	12.3	29.3	61.6	43.9	6.2	14.6	270.9	102.4
20–24	7.1	4.3	106.5	93.1	2.3	14.3	11.6	17.9	53.3	32.2	6.9	3.6	335.8	139.7
25–44	8.5	6.7	110.6	177.2	16.0	20.3	44.6	49.1	70.6	43.8	17.3	35.2	357.1	119.5
45–64	22.3	21.0	264.2	302.5	168.5	259.8	203.0	244.3	260.4	228.8	199.1	298.6	425.1	112.5
65–84	63.9	77.5	242.7	247.9	809.1	779.0	1132.7	1062.3	485.4	566.6	809.1	1628.9	566.3	283.3
85 and over .	181.8	301.6	....	....	....	1587.3	....	4761.9	4545.5	3174.6	4545.5	4761.9	9090.9	....
Unknown...	....	....	....	....	....	....	....	....	....	....	....	....	....	....
FEMALES														
All ages	8.0	7.4	130.2	102.6	48.2	83.8	67.5	77.1	71.5	68.6	37.0	67.4	29.7	23.1
Under 10 ...	12.3	8.2	27.4	....	....	....	27.4	16.6	178.3	199.6	....	....	96.0	33.3
10–14	1.7	1.6	17.3	13.7	....	....	....	41.1	17.3	13.7	17.3	....	....	....
15–19	4.0	2.0	74.2	49.6	....	4.5	16.5	4.5	41.2	18.0	8.2	4.5	16.5	18.0
20–24	5.9	3.5	141.2	87.9	12.1	3.0	12.1	30.3	60.5	24.3	8.1	12.1	36.3	9.1
25–44	7.1	5.8	152.7	137.2	38.2	46.6	57.3	43.9	55.7	43.9	28.6	37.0	20.7	17.8
45–64	16.7	18.2	162.3	122.9	229.2	393.4	191.0	221.3	105.0	172.1	210.1	241.0	9.5	49.2
65–84	75.5	63.9	215.7	142.1	970.9	746.0	2265.3	1136.8	970.9	639.4	215.7	852.6	539.4	177.6
85 and over .	114.3	213.5	....	....	....	1123.6	....	3370.8	....	2247.2	....	5618.0	....	....
Unknown...	....	....	....	....	....	....	....	....	....	....	....	....	....	....

General death rates such as we have just noticed are after all but a composite of the rates for the individual causes of death. It is instructive, therefore, to consider the above findings as to the mortality of persons born in Austria-Hungary and living in Pennsylvania and in New York in the light of the principal diseases and conditions causing death. It is necessary, unfortunately, to compare the facts for each of the foreign born nationalities with the corresponding figures for the entire group of the native born without distinction of parentage (Table IV). As compared with these rates, we have the figures (Table V) for persons born in Austria-Hungary and residing in Pennsylvania and in New York.

On examining the causes of death among the Austro-Hungarians, we find that in each state their rates from pulmonary tuberculosis are lower than those for the native born at ages 20 to 44, while at 45–64 they are higher. This observation holds for both sexes. For males in both states and for females in New York, natives of Austria-Hungary show higher cancer rates at ages 45 to 84 than do native Americans, while exactly the reverse is true for organic heart diseases. In New York, rates for Bright's disease are higher at ages 45 to 84 among Austro-Hungarians of both sexes than among the native born.

The most important cause of death among Austro-Hungarian males in Pennsylvania is violence (excluding suicide). This may be attributed to the perilous and unskilled occupations in which these immigrants engage. Throughout the entire working period of life (15 to 64), the death rates among Austro-Hungarians from this cause are about three times as high as among natives.

RUSSIANS

Next in importance among the foreign born in Pennsylvania are the Russians. These, too, are comparatively recent immigrants to this country, but they have increased by leaps and bounds since 1890. In 1910, there were in Pennsylvania 240,980 persons born in Russia, forming 16.7 per cent of the total foreign born whites and 3.2 per cent of the total white population. In New York State, there were, in 1910, 558,952 Russian born persons, constituting 20.5 per cent of the foreign born and 6.2 per cent of the total white population.

Here, too, we are dealing with a heterogeneous group which includes a large proportion of Jews as well as Poles and true Russians. Of all the Russian immigrants to the United States in the period 1899–1910, 43.8 per cent were Jews, and it is very probable that a much larger proportion of the Russians in New York State in 1910 were Jews. This is an important point to keep in mind, because the Jews usually show a lower mortality than the races among which they live. This fact has been reported independently by many observers. With the restriction in mind, then, that our figures for Russians are really for a group composed mainly of Jews, we present Table VI for the states of Pennsylvania and New York, 1910:

TABLE VI

DEATHS PER 1,000 WHITE POPULATION AMONG PERSONS BORN IN RUSSIA, AND AMONG NATIVE BORN OF NATIVE PARENTAGE, BY SEX AND BY AGE PERIOD; PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	Pennsylvania		New York	
	Native born of native parentage	Russian born	Native born of native parentage	Russian born
MALES				
All ages:				
Crude rate	14.2	9.3	15.9	7.5
Ages 10 and over:				
Crude rate	11.5	9.3	13.8	7.7
Standardized rate	12.8	13.7	13.8	13.1
Under 10	22.6	9.7	23.5	4.4
10–14	2.3	2.0	2.5	1.6
15–19	3.3	5.1	3.6	2.6
20–24	4.9	6.1	5.0	3.8
25–44	6.2	8.0	6.9	5.1
45–64	16.8	21.6	18.8	20.1
65–84	75.2	61.7	77.3	78.4
85 and over	253.0	216.2	268.9	255.8
FEMALES				
All ages:				
Crude rate	12.7	7.3	13.9	6.6
Ages 10 and over:				
Crude rate	10.9	7.1	12.4	6.8
Standardized rate	12.3	12.7	12.4	12.3
Under 10	18.6	9.9	19.6	3.7
10–14	2.3	2.3	2.6	1.4
15–19	3.3	2.9	3.2	1.8
20–24	4.2	4.1	4.7	2.9
25–44	5.8	6.3	5.7	5.3
45–64	14.4	14.1	14.3	16.0
65–84	66.6	68.8	68.2	69.8
85 and over	253.8	317.1	242.3	257.8

Disregarding the figures for the period under 10, we find that in Pennsylvania, Russian males reflect the serious hazards under which they work. Their death rates are much higher than those for the native born of native parentage at ages 15 to 64; females of the two groups in Pennsylvania do not show this difference so markedly. In New York, on the other hand, the death rates for Russians of both sexes are appreciably lower than those for the native stock at ages 10 to 44. Similar differences are observed when we consider the standardized rates for age 10 and over, the rates per 1,000 Russian males in Pennsylvania and New York being 13.7 and 13.1, respectively, as compared with 12.8 and 13.8 for the native stock.

Table VII presents death rates of Russian born persons in Pennsylvania and New York by the principal causes of death.

There is a much lower mortality from pulmonary tuberculosis among Russians than among the native born. In the age period 25–44, for example, Russian males in New York had a tuberculosis rate of 117.1 per 100,000, as against 352.0 among the native born; for Russian females, the rate was 104.7 as against 193.3. The direct relationship between the low tuberculosis mortality and the large representation of Jews among the Russian born is unmistakable. This conclusion agrees with the work of others who have studied the mortality from tuberculosis among Jews in other countries.

The cancer rate is higher among Russian males in New York in the period 45–64, the rates being 277.5 as against 150.0 per 100,000 for the native born. Russian females in Pennsylvania have a cancer rate of 326.0 at 45–64, as contrasted with 251.0 for natives, and at 65–84 a rate of 1161.8 against 649.1 for the native born. In both sexes at age periods 45 to 84, the mortality from pneumonia (all forms) is greater among Russians than for native Americans. Thus, Russian males in Pennsylvania have a pneumonia rate at 45–64 of 237.2, while that for the natives is but 166.0. In New York, the corresponding figures are 228.2 and 189.6, for the Russians and native born, respectively.

Very high rates from violence are found among Russian males in Pennsylvania; in fact, they are close to three times as

TABLE VII

DEATH RATES OF PERSONS BORN IN RUSSIA, FOR THE PRINCIPAL CAUSES OF DEATH, BY SEX AND BY AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	All causes		Tuberculosis of lungs		Cancer		Organic heart diseases		Pneumonia		Bright's disease		Violence excl. suicide	
	Rate per 1,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000	
	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.
MALES														
All ages	9.3	7.5	107.4	114.7	43.1	69.0	65.0	78.9	84.2	81.2	53.4	65.4	288.1	68.7
Under 10 ...	9.7	4.4	15.4	23.5	....	....	15.4	5.9	138.8	70.4	30.9	5.9	61.7	70.4
10–14	2.0	1.6	....	11.7	....	....	16.6	29.2	16.6	17.5	16.6	11.7	66.3	35.0
15–19	5.1	2.6	69.6	60.5	....	....	....	30.3	49.7	11.3	9.9	3.8	238.5	30.3
20–24	6.1	3.8	99.6	96.4	4.0	13.5	15.9	11.6	27.9	36.6	4.0	5.8	314.8	84.8
25–44	8.0	5.1	105.9	117.1	31.2	34.3	39.9	40.4	67.3	51.2	34.9	24.2	312.9	65.3
45–64	21.6	20.1	225.1	246.4	188.6	277.5	279.8	254.2	237.2	228.2	170.3	238.6	334.6	80.4
65–84	61.7	78.4	148.7	182.4	446.1	1026.0	817.8	1254.0	520.4	1003.2	1115.2	1322.4	297.4	205.2
85 and over .	216.2	255.8	....	....	....	....	....	5426.4	2702.7	1550.4	5405.4	4651.2	....	2325.6
Unknown...	....	....	....	....	....	....	....	....	....	....	....	....	....	....
FEMALES														
All ages	7.3	6.6	91.7	74.6	67.5	69.5	65.4	85.2	67.5	60.1	38.0	72.3	38.0	24.3
Under 10 ...	9.9	3.7	31.3	....	....	....	15.7	11.9	203.6	83.3	....	....	47.0	35.7
10–14	2.3	1.4	....	5.7	....	....	16.5	40.1	16.5	22.9	16.5	....	16.5	11.5
15–19	2.9	1.8	70.9	28.0	....	3.1	10.1	9.3	10.1	15.5	20.2	....	40.5	15.5
20–24	4.1	2.9	92.6	88.7	5.8	2.1	40.5	30.9	5.8	14.4	5.8	12.4	28.9	12.4
25–44	6.3	5.3	108.0	104.7	32.2	55.3	48.3	43.6	55.1	33.0	29.9	31.0	32.2	18.4
45–64	14.1	16.0	124.6	80.8	326.0	286.1	163.0	239.4	134.2	158.6	115.0	276.7	57.5	43.5
65–84	68.8	69.8	178.7	94.3	1161.8	613.2	1072.4	1485.8	714.9	801.9	625.6	1273.6	268.1	188.7
85 and over .	317.1	257.8	....	....	4878.0	....	4878.0	4687.5	4878.0	3906.3	....	2343.8	....	1562.5
Unknown...	....	....	....	....	....	....	....	....	....	....	....	....	....	....

high as for the native born. In New York, the rates from violence are low among Russian born. We see here the effect of different industrial conditions.

There are no recent authentic figures of mortality for persons living in Russia and, therefore, no comparisons can be made between them and Russians living in the United States.

ITALIANS

Italians in America are much more homogeneous than the Austro-Hungarians or Russians. According to the 1910 census, the number of persons of Italian birth in Pennsylvania was 196,122. This was 13.6 per cent of the foreign born white and 2.6 per cent of the total white population in the state. In New York, Italian born persons numbered 472,192, constituting 17.3 per cent of the foreign born whites and 5.3 per cent of the total white population. The bulk of Italian immigration into America has been since 1890.

Table VIII presents the death rates of Italian born persons living in Pennsylvania and New York compared with the rates for the native stock.

Beginning with age 15 and continuing through 64, the death rates for Italian born males and females are higher than those for the native stock, the single exception being in the case of males in New York at ages 25–44. This Italian excess is especially marked in Pennsylvania, due probably to conditions under which they work. It is interesting to observe that Italian females in New York State show, from ages 10 to 44, a higher mortality than the males, and the facts are similar among Italians in their own country. The standardized rates at ages 10 and over indicate that, except for males in New York State, persons of Italian birth have slightly higher mortality rates than the native born of native parents.

Among Italian males in both states, the most important cause of death is violence (excluding suicide). This fact alone is sufficient to account for the unfavorable conditions among Italian males in Pennsylvania; at every age period from 15 to 64, their rates are from two and one-half to three times higher than for native Americans. The excess among Italians in New York at these ages is much less. These relations are clearly shown in Table IX in conjunction with Table IV.

TABLE VIII

DEATHS PER 1,000 WHITE POPULATION AMONG PERSONS BORN IN ITALY, AND AMONG NATIVE BORN OF NATIVE PARENTAGE, BY SEX AND BY AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	Pennsylvania		New York	
	Native born of native parentage	Italian born	Native born of native parentage	Italian born
MALES				
All ages:				
Crude rate	14.2	9.8	15.3	9.2
Ages 10 and over:				
Crude rate	11.5	9.7	13.8	9.0
Standardized rate	12.8	14.5	13.8	12.9
Under 10	22.6	11.5	23.5	13.1
10–14	2.3	3.5	2.5	2.7
15–19	3.3	8.3	3.6	5.5
20–24	4.9	7.7	5.0	6.2
25–44	6.2	8.1	6.9	6.6
45–64	16.8	19.7	18.8	19.3
65–84	75.2	71.3	77.3	64.6
85 and over	253.0	100.0	268.9	120.3
FEMALES				
All ages:				
Crude rate	12.7	9.0	13.9	9.7
Ages 10 and over:				
Crude rate	10.9	8.8	12.4	9.5
Standardized rate	12.3	12.6	12.4	13.7
Under 10	18.6	11.3	19.6	12.7
10–14	2.3	2.0	2.6	3.4
15–19	3.3	5.1	3.2	5.7
20–24	4.2	5.3	4.7	6.1
25–44	5.8	7.9	5.7	7.0
45–64	14.4	14.6	14.3	17.9
65–84	66.6	60.9	68.2	63.8
85 and over	253.8	176.5	242.3	214.3

Italian males in both states between ages 20 and 64 are at a decided advantage as to pulmonary tuberculosis. Among the women in New York State, however, conditions are quite different at the younger ages. For example, at ages 15–19 and 20–24, the death rates from pulmonary tuberculosis are 220.6 and 247.7 among Italian women, as contrasted to 111.5 and 186.3, respectively, among native American women. In respect to organic diseases of the heart, men show lower rates at the important ages 25 to 84. This is again in contrast to conditions among women, who, at ages 45 to 84, compare unfavorably with native Americans. Pneumonia, all forms,

TABLE IX

DEATH RATES OF PERSONS BORN IN ITALY, FOR THE PRINCIPAL CAUSES OF DEATH, BY SEX AND BY AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	All causes		Tuberculosis of the lungs		Cancer		Organic heart diseases		Pneumonia		Bright's disease		Violence (excl. suicide)	
	Rate per 1,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000	
	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.
MALES														
All ages	9.8	9.2	81.5	112.1	26.2	31.9	51.7	79.5	135.4	153.4	29.8	54.3	311.5	158.4
Under 10	11.5	13.1	19.9	8.3	....	....	19.9	....	198.8	364.5	19.9	....	59.7	174.0
10–14	3.5	2.7	23.0	15.1	....	....	....	22.7	92.2	37.8	....	7.6	92.2	83.3
15–19	8.3	5.5	43.4	106.8	....	....	17.4	15.8	130.2	71.2	26.0	....	364.7	162.2
20–24	7.7	6.2	86.5	140.4	3.9	6.5	11.8	10.8	110.1	88.5	....	13.0	342.0	170.6
25–44	8.1	6.6	71.2	102.0	12.1	15.4	35.0	41.2	92.8	85.2	13.5	31.4	324.3	155.8
45–64	19.7	19.3	154.3	172.9	127.4	124.2	161.0	250.8	348.8	394.5	127.4	172.9	335.3	168.0
65–84	71.3	64.6	631.8	208.5	631.8	364.9	1263.5	1303.1	722.0	1198.9	722.0	807.9	90.3	156.4
85 and over	100.0	120.3	....	....	....	....	250.0	2255.6	....	....	....	751.9	....	1503.8
Unknown	....	....	....	....	....	....	....	....	....	....	....	....	....	....
FEMALES														
All ages	9.0	9.7	102.2	160.1	66.4	57.8	93.6	134.9	103.9	145.6	51.1	65.3	30.6	32.1
Under 10	11.3	12.7	42.0	34.0	21.0	....	42.0	8.5	209.8	391.4	....	....	83.9	153.2
10–14	2.0	3.4	....	89.1	....	....	50.3	48.6	25.1	32.4	....	....	25.1	24.3
15–19	5.1	5.7	102.0	220.6	....	....	61.2	30.1	61.2	50.1	....	10.0	20.4	25.1
20–24	5.3	6.1	153.6	247.7	....	....	23.6	50.9	35.4	57.7	23.6	6.8	....	20.4
25–44	7.9	7.0	114.8	159.3	53.8	35.8	43.0	65.4	78.9	81.5	21.5	39.5	39.5	16.1
45–64	14.6	17.9	77.7	123.3	259.0	239.6	259.0	373.6	181.3	253.7	168.4	211.5	13.0	45.8
65–84	60.9	63.8	217.3	55.4	326.1	274.9	1413.0	1649.3	760.9	1429.4	978.3	549.8	....	55.0
85 and over	176.5	214.3	....	793.7	....	....	2941.2	3968.3	2941.2	3968.3	....	4761.9	....	....
Unknown	....	....	....	....	....	....	....	....	....	....	....	....	....	....

is especially prominent among Italians. In practically every age period from 20 to 84, their rates are higher than those of the native.

Italians in Pennsylvania and New York State show, on the whole, little difference in their death rates from those prevailing in their home country. A slight excess, which is apparent at some age periods in the American figures for Italian males, is very likely the result of the hazardous employment in which they are engaged. It is interesting, also, to note that the death rates from pneumonia in Italy are lower than among Italians in this country at ages 25 to 64 for males and females.*

GERMANS

In the three foreign born groups thus far examined (Austro-Hungarians, Russians, and Italians), we have found mortality conditions which, when compared with those for the native born, are, on the whole, favorable, except in so far as the greater industrial hazards to which these foreign groups are exposed operate to increase their mortality from accidental violence. We come now to the consideration of three groups of the foreign born whose position relative to the native born is very unfavorable, even apart from deaths from accident: the Germans, British, and Irish. Their death rates in the United States are in each case less favorable than in their native land. Of these three groups, those of German birth were of the greatest relative importance in Pennsylvania and New York. In Pennsylvania, they numbered 195,185, constituting 13.6 per cent of the foreign born white and 2.6 per cent of the total white population; and, in New York State, they were represented by 436,874 persons, being 16.0 per cent of the foreign born white and 4.9 per cent of the total white population. The Germans were one of the most important elements of the earlier immigration into the United States. From 1850 to 1870, they formed the second largest component of the foreign born population in this country, being exceeded only by the Irish; and from 1880 onwards they have occupied the first rank at each census. Table X presents death rates for German born persons living in Pennsylvania and New York, by sex and age period, 1910.

* Ufficio Centrale di Statistica, *Statistica Della Cause di Morte*, Rome, 1914, p. 44 *et seq.*

TABLE X

DEATHS PER 1,000 WHITE POPULATION AMONG PERSONS BORN IN GERMANY, AND AMONG NATIVE BORN OF NATIVE PARENTAGE, BY SEX AND BY AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	Pennsylvania		New York	
	Native born of native parentage	German born	Native born of native parentage	German born
MALES				
All ages:				
Crude rate	14.2	28.2	15.9	27.5
Ages 10 and over:				
Crude rate	11.5	28.4	13.8	27.7
Standardized rate	12.8	17.0	13.8	17.9
Under 10	22.6	13.3	23.5	12.7
10–14	2.3	3.0	2.5	5.8
15–19	3.3	4.1	3.6	3.4
20–24	4.9	8.2	5.6	4.5
25–44	6.2	9.0	6.9	10.0
45–64	16.8	23.0	18.8	27.7
65–84	75.2	93.7	77.3	90.4
85 and over	253.0	284.7	268.9	263.4
FEMALES				
All ages:				
Crude rate	12.7	23.5	13.9	22.6
Ages 10 and over:				
Crude rate	10.9	23.8	12.4	22.8
Standardized rate	12.3	14.2	12.4	14.4
Under 10	18.6	9.4	19.6	10.3
10–14	2.3	1.5	2.6	1.6
15–19	3.3	3.5	3.2	2.7
20–24	4.2	4.4	4.7	4.0
25–44	5.8	6.4	5.7	6.3
45–64	14.4	18.5	14.3	18.4
65–84	66.6	77.8	68.2	83.1
85 and over	253.8	279.0	242.3	246.4

Because of the reduction of German immigration in recent years, it is necessary to begin with ages 25–44. The rates are very much higher than for the native stock, and this condition continues throughout life. Considering together ages 10 and over, the rates, when standardized for age as above outlined, are, for males, 17.0 and 17.9 in Pennsylvania and New York, respectively, against 12.8 and 13.8 for the native stock; and for females 14.2 in Pennsylvania and 14.4 in New York, as contrasted to 12.3 and 12.4, respectively, for the native stock. The rates for Germans in both states are thus distinctly higher than the rates for the natives, the excess being more marked for males than for females.

The rates for Germans at home are more favorable than for Germans in this country. Thus, the death rate for males in Germany at 25–44 was 6.4 per 1,000 in 1908–13,* as against 9.0 and 10.0 for Germans in Pennsylvania and New York, respectively, in 1910; at 45–64 German males at home showed a rate of 21.3 per 1,000, contrasted with 23.0 and 27.7 in Pennsylvania and New York; while at ages 65–84, their rate in Germany was 84.5 as compared with 93.7 and 90.4 in the two states. Among females, the German excess in this country is less marked.

In seeking to determine the causes for the high mortality of Germans in America, we find (Table XI) that the pulmonary affections and the so-called "degenerative" diseases are to a large degree responsible.

At most of the age periods, the rates for pulmonary tuberculosis among German males are greatly in excess of those of native Americans; for example, at ages 45–64, there are mortality rates of 230.3 and 350.0 per 100,000 among Germans in Pennsylvania and New York from this cause; while the corresponding rates for native born males are 174.1 in Pennsylvania and 262.1 in New York. The position of the German born women with regard to pulmonary tuberculosis is very favorable.

The incidence of pneumonia is high among persons of German birth in both states, their disadvantage from this cause being especially marked at ages 65–84. For example, at this period in life the rates per 100,000 German males in Pennsylvania and New York are 917.2 and 806.6, respectively, as contrasted with 498.2 and 607.6 for native born males. Cancer is more frequent as a cause of death among German males at ages 45 to 84, and among German females at ages 25 to 84. The differences are strikingly large among males; at ages 45–64, for example, the cancer mortality per 100,000 German males is 251.0 and 291.3 in Pennsylvania and New York, respectively, while that of natives is but 134.5 in Pennsylvania and 150.0 in New York. Almost without exception, the rates for organic heart disease and Bright's disease among German born persons, of both sexes, living in Pennsylvania and New York, are higher

* Institut International de Statistique, *Annuaire International de Statistique:* I. Etat (p. 45), and II. Mouvement (p. 75) de la population (Europe). La Hague, 1916–17.

TABLE XI

DEATH RATES OF PERSONS BORN IN GERMANY, FOR THE PRINCIPAL CAUSES OF DEATH, BY SEX AND BY AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	All causes		Tuberculosis of lungs		Cancer		Organic heart diseases		Pneumonia		Bright's disease		Suicides	
	Rate per 1,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000	
	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.
MALES														
All ages	28.2	27.5	194.9	267.4	186.7	222.1	433.8	419.3	293.4	254.9	300.4	334.9	80.0	91.9
Under 10 ...	13.3	12.7	147.9	....	....	....	....	....	74.0	423.1	....	....	....	....
10–14	3.0	5.8	....	52.8	....	....	....	158.4	....	....	....	52.3	74.4	....
15–19	4.1	3.4	....	90.8	....	....	45.4	....	45.4	....	....	22.7	....	....
20–24	8.2	4.5	211.3	45.9	....	....	42.3	....	42.3	45.9	42.3	9.2	....	36.7
25–44	9.0	10.0	198.2	252.5	10.7	40.4	72.3	75.4	112.5	94.0	32.1	67.8	56.3	53.6
45–64	23.0	27.7	230.3	350.0	251.0	291.3	292.4	328.9	269.1	269.0	230.3	332.4	95.6	131.6
65–84	93.7	90.4	140.6	211.3	589.2	732.6	1841.1	1905.5	917.2	806.6	1272.1	1306.7	140.6	137.4
85 and over .	284.7	263.4	180.2	210.7	....	737.6	3783.8	5374.1	1801.8	1896.7	1982.0	3582.7	180.2	316.1
Unknown...	....	....	....	....	....	....	....	....	....	....	....	.....	....	....
FEMALES														
All ages	23.5	22.6	90.4	115.3	256.4	264.5	379.8	396.8	214.9	205.0	210.7	274.4	20.2	22.2
Under 10 ...	9.4	10.3	....	51.7	....	....	72.6	....	145.2	155.0	....	....	....	....
10–14	1.5	1.6	....	....	....	....	72.6	53.6	....	....	....	....	....	....
15–19	3.5	2.7	39.1	76.9	....	19.2	39.1	19.2	....	38.4	....	19.2	....	19.2
20–24	4.4	4.0	128.0	158.2	18.3	....	....	15.8	18.3	15.8	....	7.9	....	31.6
25–44	6.4	6.3	106.2	125.1	58.7	81.4	69.8	40.1	30.7	44.8	33.5	43.6	14.0	13.0
45–64	18.5	18.4	85.4	109.7	351.0	333.2	287.7	288.5	167.6	136.8	186.6	245.2	25.3	27.1
65–84	77.8	83.1	72.9	106.3	709.5	773.7	1472.1	1766.5	782.4	840.1	729.4	1122.3	33.2	33.2
85 and over .	279.0	246.4	156.7	80.3	156.7	882.8	2507.8	4574.6	2664.6	2728.7	2664.6	1765.7	156.7	80.3
Unknown ..	....	....	....	....	....	....	....	....	....	....	....	....	....	....

from ages 25 onward than are the corresponding rates for native born Americans. Suicide is also an important cause of death among German males—an observation already made by a number of writers relative to Germans in their own country, and the rates are much in excess of those for the native stock.

ENGLISH, SCOTCH, WELSH (BRITISH)

Persons of British nativity were an important component of the earlier immigration into the United States, although in recent years they have been a very small part of the stream of newcomers. In 1850, they constituted 16.9 per cent of the total foreign born, but have declined in relative importance until in 1910 they were only 9.0 per cent. In Pennsylvania at the 1910 census, there were 170,356 persons born in Great Britain, or 11.8 per cent of the white foreign born, and 2.3 per cent of the total white population. In New York, they numbered 193,359, or 7.1 per cent of the foreign born and 2.2 per cent of the total white population.

The group as a whole shows high death rates when compared with the native stock. This is true of both males and females and in both states. At the ages 25 to 64, the disadvantage against the British is nearly 50 per cent. The standardized rates after age 10 are better in Pennsylvania than in New York, but even in the former state the advantage of the natives is considerable. The figures are given in Table XII.

It is difficult to understand this condition of unfavorable mortality in view of the fact that the rates for the British in their own country are among the most favorable in Europe. In the last censal year (1911), the death rate per 1,000 males aged 25–44 in England and Wales* was 6.4, as against 8.4 and 8.7 for British born males living in Pennsylvania and New York, respectively; at 45–64, British males at home showed a rate of 20.5 per 1,000, compared with 24.0 in Pennsylvania and 24.6 in New York. The conditions among females are similar.

The causes of death (Table XIII) which are responsible for the unfavorable position of the British in the United States as compared with the native born are many.

*Seventy-fourth Annual Report of the Registrar-General for England and Wales (1911), pp. 61, 62.

TABLE XII

DEATHS PER 1,000 WHITE POPULATION AMONG PERSONS BORN IN ENGLAND, SCOTLAND, AND WALES, AND AMONG NATIVE BORN OF NATIVE PARENTAGE, BY SEX AND BY AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	Pennsylvania		New York	
	Native born of native parentage	English, Scotch and Welsh born	Native born of native parentage	English, Scotch and Welsh born
MALES				
All ages:				
Crude rate	14.2	21.5	15.9	21.8
Ages 10 and over:				
Crude rate	11.5	21.8	13.8	22.6
Standardized rate	12.8	16.1	13.8	16.6
Under 10	22.6	11.0	23.5	7.0
10–14	2.3	2.7	2.5	3.7
15–19	3.3	4.4	3.6	5.8
20–24	4.9	5.3	5.0	4.3
25–44	6.2	8.4	6.9	8.7
45–64	16.8	24.0	18.8	24.6
65–84	75.2	84.2	77.3	86.6
85 and over	253.0	298.6	268.9	261.9
FEMALES				
All ages:				
Crude rate	12.7	19.5	13.9	20.6
Ages 10 and over:				
Crude rate	10.9	19.8	12.4	20.8
Standardized rate	12.3	15.1	12.4	15.8
Under 10	18.6	8.7	19.6	6.0
10–14	2.3	2.3	2.6	3.3
15–19	3.3	2.5	3.2	5.8
20–24	4.2	6.0	4.7	3.8
25–44	5.8	7.8	5.7	7.6
45–64	14.4	18.1	14.3	21.0
65–84	66.6	81.2	68.2	79.9
85 and over	253.8	283.0	242.3	279.6

Pneumonia is more prevalent among British born males and females at ages 25 to 84 than among natives. Among British males in Pennsylvania at ages 45–64, for example, there is a mortality from this cause of 343.5 per 100,000, but of only 166.0 among native Americans. Similarly, at ages 65–84, the death rates from pneumonia are 758.9 and 498.2 for the British and native born, respectively. Cancer is higher among British males from 45 to 84, and among British females at 25 to 84. Thus, there is a rate at ages 45–64 of 239.7 per 100,000 British males in New York, in contrast with 150.0 among native males; among British females, it is 360.9, while that of

TABLE XIII

DEATH RATES OF PERSONS BORN IN ENGLAND, SCOTLAND, AND WALES, FOR THE PRINCIPAL CAUSES OF DEATH, BY SEX AND AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	All causes		Tuberculosis of lungs		Cancer		Organic heart diseases		Pneumonia		Bright's disease		Violence excl. suicide	
	Rate per 1,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000	
	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.
MALES														
All ages	21.5	21.8	150.2	215.2	124.2	145.5	306.1	325.3	245.1	203.4	208.9	201.5	225.9	163.1
Under 10 ...	11.0	7.0	....	23.4	....	....	....	....	122.4	163.8	....	....	204.0	....
10–14	2.7	3.7	....	36.9	....	....	....	110.6	....	....	....	....	54.2	184.4
15–19	4.4	5.8	120.3	128.7	....	64.4	....	32.2	....	32.2	....	....	160.4	128.7
20–24	5.3	4.3	59.3	71.5	19.8	14.3	59.3	....	59.3	14.3	19.8	....	217.6	114.4
25–44	8.4	8.7	151.5	240.5	21.6	13.9	67.6	69.4	94.7	99.4	43.3	46.3	219.1	138.8
45–64	24.0	24.6	165.3	268.9	152.3	239.7	340.3	272.1	343.5	252.7	239.8	288.3	243.1	178.2
65–84	84.2	86.6	233.5	210.3	630.5	590.9	1447.8	1903.0	758.9	701.1	1004.1	861.4	256.9	290.5
85 and over .	298.6	261.9	....	....	....	1237.1	6334.9	4742.3	2262.4	1443.3	3619.9	2061.9	452.5	824.7
Unknown ...	....	....	....	....	....	....	....	....	....	....	....	....	....	....
FEMALES														
All ages ...	19.5	20.6	133.2	123.3	220.0	223.8	255.5	341.7	165.0	205.2	188.3	192.1	62.3	61.1
Under 10 ...	8.7	6.0	41.6	23.2	....	23.2	....	23.2	124.8	46.4	....	....	83.2	....
10–14	2.3	3.3	....	....	....	....	....	146.7	....	....	....	....	....	....
15–19	2.5	5.8	84.4	64.0	....	....	42.2	32.0	....	96.0	....	....	....	....
20–24	6.0	3.8	80.4	121.5	20.1	....	20.1	60.7	120.6	30.4	....	15.2	....	....
25–44	7.8	7.6	166.9	165.4	83.4	57.8	63.3	52.5	63.3	55.1	46.0	49.9	23.0	21.0
45–64	18.1	21.0	112.2	92.1	318.0	360.9	217.0	295.6	160.9	199.7	209.5	241.9	29.9	57.6
65–84	81.2	79.9	153.7	139.3	744.9	855.9	1383.3	1791.4	614.8	826.0	851.3	826.0	271.9	258.8
85 and over .	283.0	279.6	314.5	164.5	628.9	328.9	3144.6	4276.3	2830.2	4111.8	1886.8	1644.7	3144.6	822.4
Unknown ...	....	....	....	....	....	....	....	....	....	....	....	....	....	....

natives is but 287.4. Bright's disease is likewise more prevalent among British females at ages 45 to 84. The death rate from violence (excluding suicide) is higher in both states among British males 20 to 84 than among native Americans.

It is largely these same causes which are responsible for the disadvantage which the British born living in the United States exhibit when compared with their countrymen at home. For example, at ages 45–64, males in England and Wales had in 1911 a pneumonia rate of 150.7 per 100,000, as against 343.5 and 252.7 for British born males living in Pennsylvania and New York, respectively; and at the same age period (45–64) females have a pneumonia rate of 76.6 per 100,000 in England and Wales, contrasted with 160.9 and 199.7 for British born females living in Pennsylvania and New York. The facts for Bright's disease are even more striking. At ages 45–64, the rate for nephritis and Bright's disease was 116.1 per 100,000 males in England and Wales, while the figures for Bright's disease alone among British born males living in Pennsylvania and New York were 239.8 and 288.3, respectively. Deaths from accidental violence are also more frequent among the British in America; British born males aged 25–44 show rates of 219.1 and 138.8 per 100,000 in Pennsylvania and New York, in contrast with 59.8 for males of the same ages in England and Wales.

IRISH

Irish immigration into the United States reached its highest point as far back as 1850, the Irish being then 42.8 per cent (by far the largest single component) of the total foreign born in America. In recent decades, the Irish born have, with the Germans and British, declined in relative importance among the foreign stocks. In 1910, they were only 10.0 per cent of the total foreign born in this country. In Pennsylvania in 1910, there were 165,091 Irish born persons, comprising 11.5 per cent of the foreign born white and 2.2 per cent of the total white population. In New York State, the number of persons born in Ireland was 367,877; they formed 13.5 per cent of the total foreign born and 4.1 per cent of the total white population of the state. Table XIV presents death rates of Irish born

persons living in Pennsylvania and in New York, by sex and age, 1910:

TABLE XIV

DEATHS PER 1,000 WHITE POPULATION AMONG PERSONS BORN IN IRELAND AND AMONG NATIVE BORN OF NATIVE PARENTAGE, BY SEX AND BY AGE PERIOD. PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	Pennsylvania		New York	
	Native born of native parentage	Irish born	Native born of native parentage	Irish born
MALES				
All ages:				
Crude rate	14.2	40.6	15.9	40.2
Ages 10 and over:				
Crude rate	11.5	40.7	13.8	40.3
Standardized rate	12.8	23.6	13.8	25.9
Under 10	22.6	16.5	23.5	16.8
10–14	2.3	3.0	2.5	....
15–19	3.3	5.7	3.6	8.1
20–24	4.9	8.9	5.0	9.4
25–44	6.2	15.1	6.9	18.5
45–64	16.8	40.4	18.8	46.3
65–84	75.2	103.1	77.3	101.6
85 and over	253.0	301.6	268.9	286.1
FEMALES				
All ages:				
Crude rate	12.7	35.0	13.9	34.8
Ages 10 and over:				
Crude rate	10.9	35.0	12.4	34.9
Standardized rate	12.3	20.5	12.4	23.5
Under 10	18.6	29.2	19.6	10.4
10–14	2.3	....	2.6	4.1
15–19	3.3	2.5	3.2	3.9
20–24	4.2	3.6	4.7	4.1
25–44	5.8	10.2	5.7	12.0
45–64	14.4	35.1	14.3	40.7
65–84	66.6	104.2	68.2	107.4
85 and over	253.8	288.3	242.3	307.6

Table XIV shows that in this country a very high mortality exists among the Irish. Eliminating from consideration all age periods below 20, because of the small representation of the Irish immigrants at the younger ages, the Irish males show death rates very greatly in excess of the native stock; at ages 25 to 64, the rates are over two and one-half times higher. The same situation exists for females beginning with age 25.

Ages 10 and over, taken together, show crude rates of 40.7 and 40.3 for males in Pennsylvania and New York State,

TABLE XV

DEATH RATES OF PERSONS BORN IN IRELAND, FOR THE PRINCIPAL CAUSES OF DEATH, BY SEX AND BY AGE PERIOD, PENNSYLVANIA AND NEW YORK STATE, 1910

Sex and age period	All causes		Tuberculosis of lungs		Cancer		Organic heart diseases		Pneumonia		Bright's disease		Violence excl. suicide	
	Rate per 1,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000		Rate per 100,000	
	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.	Pa.	N. Y.
MALES														
All ages	40.6	40.2	342.8	589.3	209.2	237.6	557.5	560.9	530.0	451.5	399.2	471.4	357.9	305.9
Under 10 ...	16.5	16.8	....	....	....	....	274.7	140.1	274.7	140.1	....	....	....	140.1
10–14	3.0	....	....	....	....	....	....	....	....	....	....	....	296.7	....
15–19	5.7	8.1	428.0	312.3	....	....	....	....	....	....	....	....	....	124.9
20–24	8.9	9.4	127.7	327.3	....	....	31.9	21.1	63.8	52.8	....	42.2	414.9	253.4
25–44	15.1	18.5	375.8	662.9	53.7	45.2	93.1	90.3	182.5	211.2	85.9	120.9	261.3	278.3
45–64	40.4	46.3	408.8	682.1	208.1	339.1	529.3	580.2	620.5	601.7	419.8	662.5	434.4	321.4
65–84	103.1	101.6	206.1	329.3	651.3	694.7	1706.7	2088.5	1253.2	1024.0	1146.0	1299.1	412.2	406.0
85 and over .	301.6	286.1	....	357.6	232.0	1311.1	5800.5	5601.9	2088.2	1907.0	2552.2	2145.4	928.1	357.6
Unknown...	....	....	....	....	....	....	....	....	....	....	....	....	....	....
FEMALES														
All ages	35.0	34.8	201.2	276.1	269.4	269.0	493.3	600.2	395.9	411.6	387.3	453.0	143.9	95.5
Under 10 ...	29.2	10.4	....	....	....	....	291.5	129.5	583.1	129.5	....	....	291.5	129.5
10–14	....	4.1	....	138.1	....	....	....	....	....	138.1	....	....	....	....
15–19	2.5	3.9	63.6	185.6	....	....	63.6	....	....	....	63.6	....	....	23.2
20–24	3.6	4.1	121.6	167.7	....	....	....	16.8	30.4	22.4	15.2	11.2	....	11.2
25–44	10.2	12.0	235.3	353.4	96.3	82.2	90.9	100.3	90.9	110.0	85.6	117.4	29.4	31.0
45–64	35.1	40.7	220.7	250.1	352.5	432.9	513.9	656.4	448.0	523.6	421.6	636.1	118.5	104.7
65–84	104.2	107.4	140.9	192.1	657.5	684.2	1590.2	2312.1	1187.6	1331.3	1201.0	1388.6	496.5	306.7
85 and over .	288.3	307.6	148.6	....	1040.1	1207.7	4011.8	5797.1	2228.8	2898.6	2526.0	2576.5	1634.5	966.2
Unknown...	....	....	....	....	....	....	....	....	....	....	....	....	....	....

respectively, and 35.0 and 34.9 for females. These, when standardized for age, are reduced to 23.6 and 25.9 for males, and 20.5 and 23.5 for females. The rates are, therefore, nearly twice as high as those of the native stock.

An examination of the causes for these very unfavorable conditions (Table XV) shows, in exaggerated form, a situation not unlike that previously described for the German born population.

With regard to pulmonary tuberculosis, the Irish born are under a great handicap. At ages 25–44, for example, the rate for this cause among Irish males is, in each state, twice as large as for natives; thus, in Pennsylvania, the rate for Irish males is 375.8 per 100,000 compared with 185.2 for native born males, and in New York the corresponding figures are 662.9 and 352.0, respectively. At ages 45–64, the Irish disadvantage is even greater. Among females at the same ages, the disparity is somewhat less marked, although it is still present.

In both sexes at ages 25 to 84, the rates for pneumonia (all forms) are much higher among the Irish born. Irish males, 45–64, present rates of 620.5 and 601.7 in Pennsylvania and New York, while males born in the United States show but 166.0 and 189.6, respectively. Among females at corresponding ages, the situation is similar.

The facts relative to cancer, organic diseases of the heart, and Bright's disease may be summarized as follows: In the age periods 25–44, 45–64, and 65–84, which are the significant ages for these diseases, the Irish born, without exception, show higher specific death rates than the native born. This statement holds for both sexes and in both states. Deaths from violence (excluding suicide) are likewise more numerous among the Irish born.

In their own country, the mortality rates of the Irish present no such untoward conditions as they show in the United States. From ages 15 onward in the last censal year (1911), the rates for males were much lower than for the Irish in Pennsylvania and New York, the advantage at 25 to 64 being over 50 per cent.* For females after age 25 is reached, the situation is

* Forty-eighth (1911) and Forty-ninth (1912) Annual Reports of the Registrar-General for Ireland, pp. 150, 120–129.

much the same as for males. When we compare the rates for the important causes of death after 25, we find that almost without exception the Irish at home enjoy marked advantages. For example, Irish males at home aged 45–64 had, in 1911, a pneumonia rate of 163.2 per 100,000, which is in very marked contrast to the rates of 620.5 and 601.7 for Irish born males in Pennsylvania and in New York. Similarly, the pneumonia rate for Irish females (45–64) is 89.8 in their own country, as against 448.0 and 523.6 in Pennsylvania and New York. Even more striking are the figures for Bright's disease. At 65–84, Irish males at home show a mortality from this cause of but 115.3 per 100,000 as against the very high rates of 1146.0 and 1299.1 for Irish born males living in Pennsylvania and New York. For Irish females in their own country, the rate at 65–84 is only 63.8 per 100,000, an amazing contrast to 1201.0 and 1388.6 for Irish born of the same age in this country.* The mortality from organic heart disease at ages 65–84 is twice as high among the Irish living in America.

The foregoing figures for German, British, and Irish immigrants help to explain some of the features we noticed in our discussion of the general death rates in Table II. It will be remembered that at ages 25–44, the native born males of foreign or mixed parentage, that is, first generation Americans, showed in Pennsylvania a death rate of 12.3 per thousand, while the mortality of the foreign born was only 9.1; and in New York State, their rate was 14.3 per 1,000 as contrasted to 8.7 for the foreign born. At the next two age periods, the rates for these two classes of the foreign stock were very similar, and the native stock was at a great advantage.

We are now able to state the probable reasons for this peculiar relationship. In the age period 25–44, the predominating stocks which make up the native born of foreign parentage are the Germans, British, and Irish, whose death rates we have found are high. The foreign born group at the same age period, on the other hand, has large proportions of Italians, Russian Jews, and Austro-Hungarians. It is the low mortality of these races which, at ages 25–44, offsets the very

* The death rates for Bright's disease in Ireland are so remarkably low as to suggest some differences in classification procedure as a factor.

unfavorable conditions among the Germans, British, and Irish elements of the foreign born, and gives a net rate lower than that for the native born of foreign or mixed parentage, which contains no such reducing factor. But here this influence stops. The foreign born at 45–64 and 65–84 are predominantly Germans, British, and Irish; we see that their rates are almost identical with those for the native born of foreign or mixed parentage, composed, at these ages, of similar stock. The same reasoning applies to females. Here, the smaller excess of the first generation Americans over the foreign born at 25–44 is due to the fact that the rates of the two contrasting groups of the foreign born are more nearly equal than is the case among males.

We have examined each of the important nationality groups in the white population and have considered under each group the causes of death which characterize the mortality. It will now be profitable to reverse the viewpoint, summarizing briefly for each important cause of death the facts as to the various groups in the foreign born populations of Pennsylvania and New York. The causes of death will be considered in the order in which they stand in the International List of Causes of Death.

Tuberculosis of Lungs (*28, 29**).—The outstanding feature relative to pulmonary tuberculosis is the very unfavorable position of the Irish. Both sexes suffer extraordinarily from this disease during the greater part of life (25 to 84). At 25–44, the rates for Irish males are twice as high as for natives, and in the age period 45–64 the excess is even greater. The death rate among Irish males from tuberculosis continues high even at the advanced ages. The facts with regard to the Irish in the two states studied, are very different indeed from those in the native country, both as to the high rates obtained and the general configuration of the mortality curve. German and British males also show higher tuberculosis rates than the native born at the older ages. On the other hand, the Italians, Russians, and Austro-Hungarians present comparatively low tuberculosis death rates. At most of the age periods they are even lower than for the native born. Ital-

* International List of Causes of Death, 2nd Decennial Revision, 1909.

ian females in New York show a striking exception to the usual rule in that their rates are higher than those for males, especially in early life. Otherwise, there are no important differences in the several race groups with reference to this disease.

Cancer (*39–45*).—Practically every foreign race group shows higher cancer rates than do the native born. Italian males and females offer the only clear-cut exceptions. At the age period 45 to 64, foreign born males show rates from 50 to 100 per cent higher. The conditions among the Irish are strikingly bad. Among females at ages 45–64, the Germans and the British also show higher rates than do the native born, but the excess is not as marked as it is among the Irish.

Organic Diseases of the Heart (*79*).—Again the Irish present the highest rates, followed by the British and the Germans. The conditions prevailing among those from Austria-Hungary, Russia, and Italy are, on the whole, very favorable with regard to this disease. It is very difficult to understand the reason for the aberrant death rates among the Irish in Pennsylvania and New York, for they are so much higher than are those for the native stock and for the Irish in their own country.

Pneumonia (*all forms*) (*91, 92*).—From ages 45 to 84, the rates of the native born are much the lowest. The Irish are again under the greatest handicap, their rates being about three times as high at ages 45–64. The rates for Italians are very unfavorable also at ages 45 to 84. The disadvantage of the Germans, British, and Russians is less among females than among males. The position of the Austro-Hungarians is very much the same as the native born at 25 to 64.

Bright's disease (*120*).—Again, we must record the very unfavorable position which the Irish occupy. From 25 to 84 years of age, the rates for this nationality are about 100 per cent. higher than for the native born; among females, the excess is even greater. At ages 45 to 84, the rates from Bright's disease are high for Austro-Hungarians, Russians, Germans, and British. The position of the Italians is quite favorable.

Violence (*excluding suicide*) (*164–186*).—Deaths from this cause are largely from accident, and we find, of course, that the positions of the several race groups are determined by

the extent to which they engage in occupations that expose them to such dangers. The figures are especially striking for Pennsylvania where large numbers of immigrants find employment in mills and mines. Males of all the important foreign groups show very high rates from this cause, the worst conditions prevailing among the Austro-Hungarians, followed by the Irish and the Italians.

SUMMARY

1. Of the three main groups of the white population in Pennsylvania and in New York, (a) native born of native parents, (b) native born of foreign or mixed parentage, and (c) foreign born, the first has the lowest mortality. This is true for both sexes and for virtually every age period, but is most marked at the adult ages.

2. The foreign born, and the native born of foreign or mixed parentage, agree much more closely with each other than with the native stock. An interesting exception presents itself, however, at ages 25–44, at which period the foreign born have a great advantage over the native born of foreign or mixed parentage. The reason for this is the predominance of the Irish, German, and British stocks among the first generation Americans at this age period. After age 45, these two groups of the foreign stock are of the same racial extraction, and their death rates are in very close agreement.

3. The death rates of the component groups among the foreign born vary considerably. The Austro-Hungarians, Russians, and Italians present altogether favorable conditions, while the British, Germans, and Irish show death rates very greatly in excess. This is especially true of the Irish, whose mortality is about double that of the native stock. The rates for the Germans, British, and Irish are much higher in America than in their own countries. Pulmonary tuberculosis, pneumonia and the degenerative diseases including heart disease, Bright's disease, and cancer are largely responsible for this unfavorable mortality.

4. The findings of the previous study for New York State are confirmed. The unfavorable conditions of life and work among foreign races to which attention was directed in the

study for New York are found to prevail in Pennsylvania as well. The facts emphasize the necessity for special public health work for the people of foreign origin. The much more favorable economic conditions under which they live in the United States than in their own countries should result in lower death rates. But in several instances, we found that this does not prevail; the facts indicate, on the whole, deterioration rather than improvement. Is it possible that our immigrants are not representative of the best in their native countries? It has often been supposed that the immigrants comprised the most vigorous among their own people; the results, however, do not confirm this impression, but suggest many questions for further inquiry.

5. It is very important that a study similar to this one be carried out as soon as the results of the 1920 census are available, to determine whether any differences of importance have appeared in the interval of ten years.

STATISTICAL STANDARDS IN BUSINESS RESEARCH

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I. INTRODUCTION

The great war furnished the occasion, if not the motive, for business and economic prescience. It served to dignify facts and to direct the uses to which they were put. Largely due to the war, the case for business and economic planning has been won and the function of fact analysis in business has been demonstrated. The excuse for the organization and the point of view which the war developed are no longer present, but the need remains. Somehow or other, the gains secured to business, industrial, and economic research must be preserved, and the scope of research must be broadened and the method improved. A sufficient sanction for the accomplishment of these ends must be discovered and applied.

Industry has adopted a new point of view. Laboratories for experimentation are now found in the largest industrial establishments. Research under some auspices is being extended to the physical and chemical fields; to purchasing and selling methods; to production time- and motion-study; to behavioristic psychology and employment management; to market breadth, depth, and elasticity; to phenomena of prices and costs, and to the factors by which market fluctuations may be anticipated and uncertainties discounted. Hardly a week passes without the establishment within some business of so-called research departments, or the organization of private agencies for research purposes. Problems of personnel, marketing, costs, industrial relations are all being subjected to some sort of analysis. How scientifically this work is being undertaken, how completely the motive and methods are influenced by considerations of profits, it would be impossible to determine without an analysis of each unit. Such an analysis, although it may be needed, cannot be made here. The purpose of this paper is less comprehensive and, it is believed,

more important at the present time. It is to formulate in brief compass some of the more fundamental statistical standards of business research, and to suggest the content of scientific method when applied to the study of business problems. It is not to enumerate a series of rules of procedure covering the different stages in statistical analysis. To do this would be to repeat what has been written elsewhere. The broader task is attempted with the hope of contributing something to the technique of scientific method when applied in business research.

The method of treatment is *first*, to state the case for research in business fields; *second*, briefly to explain the research point of view and method, with special application to business problems; *third*, to formulate the standards to which research must conform throughout the different steps in statistical analysis. This is done by considering (a) standards for business facts, (b) standards for collection or summation, (c) standards for classification and tabulation, (d) standards for graphic representation, (e) standards for interpretation, (f) standards of organizations for research purposes when research is undertaken as a regular part of university work.

II. SCIENTIFIC METHOD AND BUSINESS RESEARCH

Research involves both a point of view and a method. The point of view is an unconditional demand for the truth; the method is (1) intelligent observation, (2) scientific measurement, (3) impartial analysis, (4) logical inference, and (5) sincere application of the conclusions reached to the problems to which the facts and observations apply.

Scientific method has been defined as a state of mind, and this is probably a true characterization if the qualification is added that the point of view which it represents is consistent in seeking the truth, and in being guided by facts, not at one time, in one place, or under one condition, ignoring them when it becomes advantageous or when they are difficult to determine, but in all places, at all times, and under all conditions. To the fact analyst, imbued with the spirit of scientific method, facts are facts. They are welcomed for the truth which they contain. The attitude toward them and toward the changes

which they make imperative, or the beliefs or customs which they challenge, is positive, receptive, and open-minded; not negative, doubtful, and hesitant. It is not a little truth, but the whole truth, which is desired. The essence of science is not so much in its content or in its product as it is in its method.

Research implies a laboratory from which facts may be secured or in which they may be developed. Because of the frame of mind which the war developed and nurtured, business today, in many respects, constitutes an ideal laboratory. Merely as the result of daily operations, great masses of comparable facts which may be statistically expressed are currently developed. Some of these are crude, it is true,—they are "in the rough." This is especially so in small businesses where accounting principles are neglected or ignored, or where competition, state control, or public necessity has not required comparable records to be kept. In the larger industries, however, where markets are wide and competition severe, and where large-scale production, utilization of waste, and the creation of by-products is the rule, the facts are far more nearly satisfactory. Not for all purposes, of course, for no business fact, however carefully prepared, is equally good for all purposes. Definition, measurement, and use are interrelated; they cannot be divorced from one another. The field for business research is ready or in preparation; the sanction for research is daily being extended to private and public agencies. This sanction must neither be abused nor destroyed.

There are two approaches to business analysis or research which, for convenience, may be described as the *inside approach with an outside perspective*, and the *outside approach with an inside significance*. The discovery of business principles, the measurement of business success, the anticipation of business difficulties, and the elimination or adjustment of business risks and friction are the ends sought in both approaches. The methods employed and the facts considered are different, more in their scope than in their essential nature.

Research addressed to *inside facts with an outside perspective* extends to costs, sales, markets, credits, production methods and control, personnel, wages, and conditions of employment. Its purpose is to eliminate waste of materials, money, and

effort; to increase production and sales, and to decrease costs. Its end is narrowly pecuniary; the motive which prompts it, acquisitive; and its results are generally of restricted consumption. The increase of profits is its *raison d'être.*

Research addressed to *outside facts with an inside significance* proceeds differently. Individual experiences are lost in the totality of experiences as they are shown in *trends* of production, earnings, costs, prices, credit, wages, population growth, concentration, etc. The aim is not so much to secure an immediate increase of profits as it is to measure or to anticipate demand, to forecast change, to bridge the gulf between the present and the future, and to measure and to correlate the economic and social forces which determine business growth and decline. The long-time viewpoint and the study of fundamental causes and effects are the controlling factors. Obviously, the results of this type of research, if it accomplishes its end and its results are utilized, may be as narrowly pecuniary as the results of the other. The facts observed are much the same, but the approach is different. The methods followed, in so far as they are scientific, are identical. Scientific method knows no variation; it does not find its justification in the salability of its product.

These two phases of business research are complementary. For those who are studying business from the outside to lose sight of the inside facts is unscientific; for those who are studying the inside facts to fail to appreciate their outside significance is without justification. "Inside" and "outside" are simply different points of view. Acquisitively, the inside perspective seems to be more important; socially, the outside looms the larger.

III. BUSINESS FACTS—STANDARDS TO WHICH THEY MUST CONFORM

The measurements of business facts, statistical or otherwise, are always relative; they require the use of both a unit and a standard of measurement. Standardization in measurement implies homogeneity; it suggests conformity and suitability to conditions determined in the light of particular application. Measurement involves not only an application of a unit of

measurement, but also an interpretation of the results obtained from the application. Things which are equal to each other in name are often not so in use or in meaning. The meaning of a measurement of a business fact is a function of the use to which the measurement is put. The point which is being made is that the meaning, use, and measurement of business facts cannot be dissociated. Scientific method requires that business problems be broken up into their various parts, that they be measured by standardized units, and that comparisons between them rest upon common qualities.

As a basis for the application of scientific method to business problems, statistical units must, *first*, be homogeneous. Characteristics that are significant for the purpose for which facts are to be used, must not be ignored. It is, of course, impossible to secure perfect homogeneity. It is not impossible, however, to classify differences according to the significance that these have for particular uses. After all, homogeneity is simply relative. Differences that are significant from one point of view may be ignored from others. Statistical methods require that facts, as well as the differences that characterize them, shall be classified, and that the bases of classification for both shall be chosen according to the significance which they have for particular uses.

Second. Statistical facts must be *representative.* Facts that, because of the ignorance or design of those who collect or use them, do not meet this condition, are an uncertain base upon which to formulate business judgments. Where bias rules, occasions for error exist. It is immaterial whether bias results from wilful elimination of a part of the facts, from basing conclusions on insufficient or unrepresentive data, or from comparing periods and conditions that have nothing in common. When business problems are approached scientifically, truth is desired and every effort must be made to secure it. It is the function of facts to reveal the truth, not to conceal and distort it.

Third. Facts must *fit;* they must be germane. Here, the consideration is not primarily of measurement, but rather of interpretation. Ignorantly or wilfully to select facts at random and without definite purpose in order to support a con-

tention, or to excuse or develop a business policy, violates every phase of scientific method. Both intelligent observation and logical inference are sacrificed. The fundamental principle which requires that every fact be referred to the condition which can produce it, is violated.

Fourth. Facts must be *stable.* They must relate to purposes and conditions that are essentially uniform. While absolute uniformity is unthinkable, essential uniformity is possible of realization. Business judgments based on exceptional or erratic observations, conditions, or periods, are unstable. It is necessary to distinguish between short- and long-time influences, between exceptional and normal relationships, between periods of decline and periods of growth, between cyclic and secular trends, between transitory phases and permanent tendencies. Business facts and relationships are constantly changing. In some, fluctuations are rapid; in others, infrequent. In some, they are sporadic; in others, they are periodic. The measurement and interpretation of facts must be adjusted to time, place, and condition.

Fifth. Both the facts themselves and the conditions of measurement must be *comparable.* Like can only be compared with like. Shifting conditions of measurement and changing units cannot be tolerated. The measuring stick and the method of applying it must be uniform for all measurements.

Sixth. Facts must be *accurate.* Accuracy is affected by the conditions under which facts are reported and collected, by the unit which is used, and the method by which it is employed. Absolute accuracy in most lines of research is unthinkable; essential accuracy is generally realizable. Business facts, like others, are generally variates, the measurements serving merely as sufficient approximations to an ideal. In the matter of price changes, Dr. Mitchell has forcibly called attention to this fact.

Statistical standards of accuracy allow for the corrective elements of chance and give free play for the operation of the "law of averages." Biased errors of unknown amounts and direction are disturbing, but unbiased errors, subject to chance distribution, are of little significance when problems are studied in the aggregate or as totals. But to expect errors

always to be compensating, and truth always to emerge from a tissue of falsehood is to be too sanguine. "The other things" which one so confidently hopes will remain "equal," rarely so behave for business phenomena. That caution which urges one to stay close to the original data, verifying truths and correcting errors, is no less applicable to statistical than it is to any other form of research.

Such are the statistical standards to which business facts must conform. The degree to which they have been realized in statistical facts will determine the standards of collection, analysis, and interpretation to which they may be subjected.

IV. STATISTICAL STANDARDS IN THE COLLECTION OF BUSINESS FACTS

Business facts constitute the raw material for business research. They are developed in the routine processes of sales, production, employment, accounting control, and administration. Business relationships, policies, and principles are founded upon them. How may they be secured for research purposes? What are the standards which should govern their collection or summation?

First. Business facts must be collected for a definite purpose. Statistical analysis cannot proceed as if it were in a vacuum; the meaning of a statistical fact is dependent upon the use to which it is put, and the costs of collection are justified only in the realization of a purpose. For collection to proceed without a definite goal in mind is not only wasteful of time and money, but fatal to the idea of research. Facts are not equally good for all purposes. The acts of measurement and of classification presuppose a purpose. To ignore this truth is to proceed unscientifically. Fruitless investigations, carried on at enormous costs and resulting in ill-will on the part of those who are interested in the results, discouragement on the part of those who are undertaking them, and a tendency to scout the idea of research and the function of experts, are largely if not solely traceable to a violation of this seemingly self-evident truth.

Second. Business facts must be collected in standardized units and under uniform methods of application.

Third. A sufficient sanction for the collection or use of data must be secured. To formulate a definite purpose for which facts are desired is the first condition for securing this. It is generally, but not always, necessary to demonstrate that personal advantage will result from a study of the facts furnished. But more than this narrow appeal may be made. Research for its own sake, or in cases in which the results are not capable of immediate capitalization, now appeals to business interest. There is a remarkable tendency for interest to center in a study of principles. "The study of fundamentals" is a business watchword today. Sanction may be secured through coöperation. Research may be made not only *of* business but *with* business. Sanction may be secured not only by granting that facts will be made available for use, but also by insisting that a representative body of the industry or interest studied shall be appointed with which the research organization may and should constantly consult.

Fourth. Standards of collection require that the full import of such questions as the following shall be considered: (1) For what periods, under what conditions, and for what places are the facts available? Are the purposes and methods of research conditioned by the answers secured? (2) Will *available* facts be given, or may they be assembled; and if so, in what units, with what degree of accuracy, and with what effect? (3) Do the schedules or forms used in collection provide for keeping confidential the data supplied? (4) Are the units of measurement which are employed standardized and understood? Do they follow or run counterwise to the terminology of the records employed? How may necessary adjustments be made, and with what effect?

Fifth. Statistical standards require that wherever possible the truth or error of business facts shall be verified. Against the imputation of gullibility, those in charge of research should always be capable of defending themselves. To take on faith the plausible, or to discard seeming exceptions, is not in keeping with scientific method. Verification requires more than testing mechanical accuracy and removing apparent inconsistencies. It involves an analysis of the composition of groups and totals, and a scrutiny of the uniformity of measurement

and the methods in which units are applied for different times, places, and conditions.

Sixth. The field from which data are secured must be adequate and the facts inclusive or representative. The choice of the field and the selection of the facts depend upon the purpose for which research is undertaken. A problem requiring inclusive data must be approached differently from one which may be studied by means of samples. Standards of collection may, indeed, become standards of elimination; and balance and consistency, rather than merely the verification of accuracy, may become the goal.

V. STATISTICAL STANDARDS IN TABULATING BUSINESS FACTS

Tabulation is a means, *first*, of recording in fixed form a classification previously developed, or, *second*, of placing similar facts in juxtaposition or in groups as a preliminary to a final classification. It is a device for projecting on a surface, capable of being read in two dimensions, a classification which has been worked out, or is being worked out. It is a method of recording a process of thought. It is inelastic in structure; the facts which it contains are in truth "locked up." Classification precedes; tabulation follows. The sequence of thought is from purpose to method.

The statistical standards to which tabulation must conform are as follows, and here again it is necessary to repeat that it is not the purpose of this paper to formulate a set of rules governing the make-up of tabulation forms, but rather to develop the statistical standards in tabulation which lie back of the rules, the realization of which may require a variable technique.

First. Every tabulation surface should faithfully record the classification which it is intended to depict. The purpose of tabulation and the standard to which it must conform cannot be divorced.

Second. There is always a *best* form of tabulation for a given purpose, as there is a most logical basis of classification. Indiscriminate choice of forms is as much without justification as is a meaningless or superficial classification.

Third. Every tabulation should be adjusted in form and complexity (a) to the subject matter which is to be expressed,

and (b) to the person for whom it is prepared, or to the end to which it is addressed.

Fourth. The order of detail in tabulation forms should be adjusted so as to be emphatic. It should be natural, not artificial; convincing, not purposeless.

Fifth. Statistical tables should carry only relevant data. The reciprocal relation between relevancy of fact and the purpose to be accomplished by tabulation, is the thought which is stressed.

Sixth. Statistical tables should carry on their face both their justification and their explanation.

Seventh. The details of statistical tables should be mechanically accurate, and their grouping and arrangement consistent, logical, and serviceable.

Eighth. The natural order in classification is from detail to summary; the serviceable order in tabulation is from summary to detail.

Ninth. Brevity is said to be "the soul of wit." It is equally true that conciseness in tabulation is the secret of its effectiveness for business purposes.

VI. STATISTICAL STANDARDS IN THE GRAPHIC PRESENTATION OF BUSINESS FACTS

The excuse for the use of graphics in business research is largely if not wholly their universal appeal. Graphs speak a common but frequently an inarticulate and confused language. There is an attractiveness about them which is alluring but often deceptive. Their appeal is visual and instantaneous, not necessarily reasoned and reflective.

Again distinguishing between rules for graphic presentation and the standards which give pertinency to the rules, the following standards may be formulated:

First. A statistical fact and its form of representation should agree. By this single standard, deception, whether resulting from a confusion of the apparent with the real, or of the superficial with the fundamental, is fully provided against. The object of business research, as it is in all research, is the establishment or determination of truth. Standards for graphics provide for their use in influencing but never in deceiv-

ing men. In spite of the standards adhered to, however, both results may be accomplished by the same graphic device. "It is their appeal, their smug finality, which suggests their virtues and at the same time conceals their weaknesses."

Second. Graphic forms should be selected according to their psychological appeal and their ease of comprehension, care always being taken not to violate the first standard.

Third. Graphic forms should be chosen in accordance with (a) the form and complexity of the subject matter illustrated, and (b) the type of consumer for whom they are intended, or the purpose which they are designed to serve.

Fourth. Graphic devices should be considered more as illustrations of analysis than methods by which analysis is made.

Fifth. Graphic figures should be drawn as accurately as a visual representation will permit. Accuracy, of course, is never absolute. In graphics, the realization of relative accuracy of each part and of the totality is the standard set. To this standard, a corollary is needed; graphic forms should always be accompanied by the original data which they represent.

VII. STATISTICAL STANDARDS IN THE INTERPRETATION OF BUSINESS FACTS

All forms of research involve an application of the scientific method. But business research offers peculiar difficulties. In far too many cases, it is undertaken for profit and influenced by conditions of profit. It is seriously undertaken today and overthrown tomorrow; adopted in one line of endeavor and scouted in another. It is undertaken by fits and starts, first welcomed and then dismissed. The results are too frequently given a narrow interpretation and are restricted to purely inside affairs without an appreciation of their intimate relations to outside facts. Business and industry are too often considered as made up of independent units, or as involving separate problems, sections or individual aspects of which may be studied separately, and the facts concerning them independently interpreted. For instance, those engaged in research in time- and motion-studies have only lately, if at all,

come to appreciate the fact that men, not automatons, are under the microscope.

Business is complex and so must be the interpretation which is given to business facts. To look for a single meaning in, and to expect a single consequence to follow from, a group of business facts is to be grossly unscientific.

Given a related group of business facts which have been collected, tabulated, and graphically expressed according to the conditions that have been formulated, to what standards must an interpretation of them conform? To fail to attach meaning and significance to them as bases for business policy and foresight, is merely to accentuate the all too prevailing practice of leaving untranslated into business standards and principles the myriads of facts daily growing out of, or experienced in, business relations.

Some of the fundamental standards of interpretation are as follows:

First. The truth is the end sought; error is not to be disguised, falsehood tolerated, or preconceptions favored.

Second. Comparisons can be made only between things, conditions, times, and places having common qualities.

Third. In interpretation, facts must always be referred to conditions which can produce them.

Fourth. Interpretation should extend to an explanation of the past and a forecast of the future. For business purposes, facts are more significant as bases for planning future policy than for explaining or justifying past action.

Fifth. Distinction should be made between long- and short-time conditions and consequences; between transitory skirmishes and general tendencies.

Sixth. Avoid the error of confusing the results of a single cause with the results of a combination of causes; of identifying proximate and remote causes; and of expecting a single cause always to give rise to a single effect. A given cause is not an homogeneous thing except when viewed in the broadest way. The effects which seem to follow from it do not come as an undifferentiated whole, but as variations. Some come as coincidences; others, as sequences spread over long or short periods. Both cause and effect are in reality variates.

Seventh. Distinction should be made between drawing a particular deduction and giving it general application.

Eighth. Similarities and differences should be appraised in the light of particular application. Similarities that are complete for one purpose are incomplete for others; and differences that are fundamental for one purpose often may be ignored for others.

Ninth. The detail of interpretation should conform to the nature of the problem and to the capacity of those interested. Not infrequently an exaggerated accuracy, which the nature of the basic data does not justify, or the occasion for summarizing warrant, is worked out in meticulous detail by means of percentages, averages, and other summary expressions. Similarly, far-reaching conclusions are sometimes drawn from inadequate data by elaborate and over-refined methods. Statistical analysis then appears as an inverted and unstable pyramid.

Likewise, involved and complex interpretations are sometimes prepared for those who are statistically ignorant of refined processes, or for those who are disinclined to follow or are uninterested in pursuing an elaborate analysis. A statistical interpretation designed to influence executive action or to enlist administrative support is rarely, if ever, to be couched in the same language or to include the same detail as one which is intended to serve the simple purpose of record. Consumers of statistics differ not only in their statistical interests but also in their statistical horizons.

VIII. ORGANIZATION FOR BUSINESS RESEARCH

The goal set by research organizations in the study of business facts and practices should be to realize for each of the steps in analysis, the standards which have been enumerated. No one form of organization is best suited to accomplish this for all purposes. The relation of purpose and method is as significant in this respect as it is for the other aspects of research. A simple analysis, extending only to the surface phases of business problems, may be made by loosely formed and unscientifically disposed organizations. On the other hand, a comprehensive analysis, extending to the deeper

significance of business facts and practices, requires a correspondingly elaborate and scientifically inclined organization. The one indispensable condition that must always be met is that imposed by the standards of the scientific point of view. The requirements of this standard are of universal application; the way in which they are to be realized varies in each organization according to the scope of the problems that are studied and the required technique.

STANDARDIZATION OF THE CONSTRUCTION OF STATISTICAL TABLES

By Edmund E. Day, *Harvard University*

The progress of every art should be marked by the accumulation of an increasing stock of generally accepted practices. As these practices obtain common approval, they should be recognized as standard and regularly followed until more satisfactory methods are discovered. A measure of standardization is thus a normal feature of development.

Standardization nevertheless has its dangers. Like "law and order" in civil life, it may be overdone. There is always the risk of formalism. But kept within proper limits, standardization has a steadying influence which tends to accelerate, not retard, the advancement of the art. It effects good order, and is an unmistakable mark of real progress. It is consequently profitable to consider from time to time the extent to which standardization can advantageously be accepted. In statistical exposition, the standardization of graphic methods has been one of the gratifying advances of recent years. To what extent has there been and to what extent are there further opportunities for a similar standardization of practice in the methods of tabular presentation?

In considering this question, it should not be thought that standardization is accomplished only through the conscious adoption of rules and regulations set up by recognized organs of authority. Standardized statistical practices may evolve by imperceptible degrees through the influences of imitation and prestige. This is particularly the case if some one statistical bureau is the fountain-head of governmental practice. The working rules of such an office tend to become the rules of a following of less influential practitioners. Standardization of this kind is going on at all times. Such standardization of practice as we have today in statistical work in this country is almost altogether the result of these influences of imitation and prestige.

Unconscious standardization of this sort has already made substantial progress with regard to the structure of statistical tables. Without attempting a complete enumeration of the rules observed by competent authorities, a few of the standard practices may be noted in passing. It is generally recognized: (1) that every table should be self-sufficing, containing within itself a clear explanation of the meaning of the items displayed; (2) that every table should be logically a unit, containing only data which are intimately related with one another; (3) that column- and row-headings should be brief, unambiguous, and self-explanatory, table footnotes being used when necessary to make the headings perfectly clear; (4) that coördinate and subordinate relationships among the column- and row-headings should be shown by variations of boxing in the captions and of indentation in the stub; (5) that varieties of letters, figures, lines, column-widths, and interlinear spacings should be employed to facilitate easy and intelligent use of the table; (6) that columns and rows should be lettered or numbered if cross reference is desirable; and (7) that sources and units should invariably be indicated. The common acceptance of these principles represents no mean advance in the standardization of statistical table structure.

It is to be observed, however, that the standardization thus far effected concerns primarily the constituent parts of the table, not the table's general form. The choice of position between columns and rows, the arrangement of the several columns or the several rows, and the location of particular columns toward the left of the table or of particular rows toward the top, seem still to be matters of individual preference, if not of chance. It is important to consider how far standardization of the general form of statistical tables is feasible and desirable.

Standardization of the general form of statistical tables must begin with a distinction between general-purpose and special-purpose tables. The general-purpose table is designed to bring together in most convenient and accessible form all the data bearing upon a given topic. The special-purpose table is intended to throw into relief relationships of special significance in a given study. The general-purpose table is

an orderly presentation of statistical material; the special-purpose table, a record of the results of statistical analysis. Of course, a measure of analysis is a prerequisite even of the general-purpose table, but the analysis is of a different order. It is the analysis essential to effective enumeration and tabulation, not the analysis accompanying specific interpretation. The analysis required for the special-purpose table is directed toward a particular issue. The problems of good table structure are essentially different for the two types of tables.

Since the construction of the general-purpose table is the simpler case, it will be examined first. In considerable measure, the general-purpose, or primary, table is a creature of the physical form of the medium in which it appears. Upon the one hand, the table tends to expand to accommodate the large body of data pressing for inclusion. Upon the other hand, the capacity of the printed page—even if it be folio—stands as a limit on the indefinite enlargement of the table. Tables which are allowed to exceed the dimensions of the page and have to be folded in are everywhere recognized as objectionable. Loose tables, separately printed in large irregular sizes, are as bad, if not worse. Tables running across two pages facing one another are reasonably satisfactory, but are to be avoided where possible. Tables which are presented at right angles to the text fall into the same class. In general, the single page, held as when reading the text, is the maximum size to which the statistical table should be permitted to run. Primary tables usually press upon this physical limit; their outside dimensions are thus independently determined.

Within the table, similar influences are at work. Whether given arrays of data shall be exhibited in columns or in rows is commonly a question of the difference in the vertical and horizontal capacity of the page. The maximum number of lines in a table is several times greater than the maximum number of columns. Consequently the arrays having the greatest number of items are naturally assigned to the columns, the other arrays to the rows. Once a given set of headings has appeared in caption- or stub-position, there is a strong presumption in favor of its occupying the same position in other related tables, for the transcription of data from general

tables is thereby facilitated. Upon the whole, however, the assignment of columns and rows rests fundamentally upon the greater capacity of the column—a factor not subject to modification by the statistician.

A much larger measure of option may be exercised in fixing, in a general-purpose table, the order of columns and of rows. Almost any systematic plan may be adopted; but the most satisfactory arrangements are the alphabetical, chronological, geographical, or according to the magnitude of the items. There are no grounds for urging the adoption of any one or two of these arrangements to the exclusion of the others. Now one best serves; now another. One rule, however, should govern the final selection in all cases: that order should be employed which keeps the details of the table most generally accessible. Readers will come to the table with a variety of interests. They should be given that table from which in general they can most easily draw the information they seek. Arrangement according to magnitude or importance of items is less satisfactory in general-purpose, than in special-purpose tables, because it depends upon analysis from a single point of view and it is frequently unwise to commit the table to this particular viewpoint. The other arrangements better meet the variety of needs which a primary table is designed to serve. The important end is to secure some logically and commonly understood arrangement which opens the table to easy transcription.

When geographical or chronological orders are adopted, a decision has to be reached as to what items to place at the top and left, and what items at the bottom and right. In the tabular arrangement of the states of this country, the grouping and order followed by the Bureau of the Census may be recognized as standard; the northern New England states stand at the head of the list, the southern Pacific states at the foot. In general, the best statistical practice for this country would seem to be to run geographical series from north to south and from east to west. With chronological series the case is not so clear. Upon the whole, however, for general-purpose tables, the Census Bureau practice of placing most recent dates at the top and left seems commendable if there

is a fair presumption that the figures of most recent date will be most frequently transcribed. When, however, the data probably will be transcribed in entirety as time series, it would seem preferable to place the figures for earlier dates toward the top and left. The rule to apply in all these cases is simple: the most generally useful data should be located toward the top and left where accurate transcription is rendered easier by close proximity to the column- and row-headings.

The general or primary table exhibits no specific analysis. Its form is in considerable measure the resultant of the physical limitations of the page and the necessity of presenting a maximum body of data in a way that will make the most generally useful parts most readily accessible. The derived or analytical table is a different statistical device. A derived table is essentially deficient if it fails to exhibit a carefully formulated analysis. It should be constructed to assist a specific interpretation. Every effort should be made to make the table simple. It should contain only those items valuable to the analysis, arranged so as to encourage the deductions the reader is expected to draw. If any line is to be traced between statistical tabulation and statistical analysis, the primary table displays the results of tabulation, the derived table the results of analysis.

Despite this fundamental distinction between primary and derived tables, it is to be admitted in the first place that the derived table is not altogether free from the influences of format which play so important a part in shaping the primary table. For example, if the number of subdivisions in one classification of an analysis is much greater than in the other, it may be necessary to put the more extended classification in the stub merely because stub-capacity is normally so much greater than caption-capacity. Similarly, if the designations in one classification are much longer than in the other, it may be necessary to place the classification with longer headings in the stub, since neither of the alternatives—printing the longer headings vertically at the top of the columns, or widening the columns to accommodate the longer headings horizontally—is at all satisfactory. Such crass considerations as these are at times decisive in determining the structure even of the

derived table. But they play a much less inportant part with the derived table than with the primary table. As a rule, the statistician is able to make the general form of the derived table serve the exposition in hand.

One of the most fundamental questions of structure is the assignment of data to columns in some instances, to rows in others. This matter should be settled in the derived table with reference to what comparisons it is most important to present. Comparison of like items in a column is much easier than of like items in a row. It is believed that recognition of this fact will commonly throw chronological, geographical, and quantitative classifications into the stub, and qualitative classifications into the caption; but this is not a necessary outcome. The important principle is to use the column position to promote the more significant comparison.

Arrangement of the several columns and of the several rows in the derived table will be determined by the particular character of the analysis in connection with which the table is employed. If the analysis is of a temporal distribution, a chronological order will be adopted; if of a spacial distribution, a geographical order. If the items are component parts of an aggregate, arrangement will be either according to the relative magnitude or importance of the item, or according to some other order generally recognized in the analysis of the data in question. Presumably the alphabetical arrangement will seldom be followed, since it does not directly disclose significant relationships. Ordinarily the purpose of the analysis will indicate clearly enough the order in which the columns or the rows should be placed.

Naturally, the arrangement of columns and rows should give proper regard to the fact that the most conspicuous position in a statistical table is at the top and left. While it is generally true that derived tables are designed to bring out relationships rather than individual items and that these relationships are properties of the table as a whole rather than of particular parts, it may be desirable in some tables to focus attention especially upon certain more important items. When other considerations will permit, these more important items should be placed in the most exposed positions of the

table: namely, at the top and left next to the captions and stub. This rule is a sufficient warrant for placing totals at the top and left when they are clearly the most significant items of the tabulation, and when placing them at the top and left will not give serious offense to the users of the table. If either of these conditions is not present, it would seem preferable to place totals in the positions in which most readers expect to find them, namely, at the bottom and right. There appears to be no adequate reason for departing from the established practice of reading time from top to bottom and left to right. In derived tables, figures for later dates should appear toward the bottom and right. It is the relation between items, not the individual item, which is significant in time series. For many reasons we are accustomed to think of the upper or left-hand of two figures as the earlier, and we draw our conclusions accordingly. Furthermore, this rule is already thoroughly incorporated in our graphic practices. To have diametrically different rules for graphic and tabular presentation would be unfortunate. The Census Bureau practice of placing data for most recent dates at the top and left is therefore not to be approved for the derived table. Effective exposition of the statistical evidences is better served by the order which seems most natural to the great majority of readers. Arrangements of columns and rows should hold fast to the purpose of facilitating interpretation.

If the dominant purpose of the derived table be kept in mind, many problems of tabular arrangement will be readily solved. Percentage distributions will be placed next to the corresponding absolute figures or in a separate portion of the table, according to the emphasis of the analysis. To facilitate comparisons of relationship, the arrangements adopted in one table of an analysis will be followed as closely in the other tables as other more important considerations will permit. Columns and rows which are to be compared with one another will be brought as closely together as possible. Unnecessary digits will be dropped and items given in round numbers to simplify the presentation. The aim throughout will be to make the derived table an effective instrument of statistical exposition.

If such are the considerations involved in the construction of statistical tables, what conclusions are to be drawn regarding the possibilities of standardization of table structure? Upon the whole, the opportunities for complete standardization seem slight except with regard to the elements from which the table is to be constructed, and certain lesser matters of general arrangement. More is to be gained at this time from a clear recognition of important guiding principles in table construction. Careful attention must be paid to the difference of purpose in primary and derived tables. The primary table must be made to offer its items for easy transcription; the derived table, for ready deduction. If statistical tables are formed with nice regard for these fundamental aims of tabular presentation, standardization may well be allowed to proceed as it has heretofore, through imitation of the most satisfactory existing practices. Untiring experiment with varying forms and ready acceptance of improvements are for the present the most promising means of securing better construction of statistical tables.

A CONTINUOUS CENSUS OF PRODUCTION: A ROUND TABLE DISCUSSION

Editor's Note: The Committee on Business Statistics of the Association has been engaged for several months, in coöperation with various trade associations and governmental agencies, in an attempt to formulate plans for the setting up of monthly, or other frequently compiled statistics of output in key manufacturing industries. Such statistics, if available, would be of special importance, not only in the measurement of general business activity, but also as a basis for the production, sales, and financial programs of industries whose activities were directly or indirectly related to the figures compiled. The committee held an important conference on this subject in New York City in December, and the discussion was continued later in a round table meeting at the annual meeting of the American Statistical Association in Chicago. The following account, prepared for the QUARTERLY by Mr. M. C. Rorty, sets forth the substance of this round table discussion. As the result of these meetings, the committee is now undertaking to arrange for certain specific monthly compilations.

The chairman (Mr. M. C. Rorty) opened the discussion by stating that, among the persons concerned with the measurement and forecasting of business activity, whether in a broad way or for individual industries, there was a growing demand for indices of the volume, or quantity, rather than the value of production. At present, price fluctuations are so great that statistics of values, alone, are relatively useless. Statistical series, in order to be of service in measuring business activity, must be issued at short intervals, must be promptly compiled, and, for present use, must have been in existence for a long enough period to enable reasonable allowance to be made for seasonal, if not for secular, trends. The list* that had been distributed to the members present was believed to be substantially complete as to serviceable volume indices. It would be noted that reasonably comprehensive figures were available for agricultural and mineral products, but that there was a serious lack of indices of manufacturing activity. The purpose of the present discussion was, therefore, primarily to determine what additional indices of manufacturing activity

* Reproduced on following pages.

A LIST OF SERIES NOW AVAILABLE SHOWING VOLUME OF PRODUCTION IN THE UNITED STATES

	Unit	Description of Series	Period	*Available Since	Issued by
AGRICULTURAL PRODUCTS:					
Foodstuffs—					
Butter	Pound	Production storage	Month	1917	Bureau of Markets
Cheese	"	" "	"	"	" " "
Eggs	Case	Storage	"	"	" " "
Oleomargarine	Pound	Production storage	"	"	" " "
Cattle	Number	Number slaughtered	"	"	" " Annual Industry
Calves	"	" "	"	"	" " " "
Swine	"	" "	"	"	" " " "
Beef	Pound	Dressed meat	"	1918	" "
Veal	"	" "	"	"	" " " "
Pork	"	" "	"	"	" " " "
Pork	"	Storage frozen, salt	"	1917	" " Markets
Lard	"	Storage	"	"	" " "
Wheat	Bushel	Production	Year	1868	Statistical Abstract
Wheat Flour	Barrel	Production, Stocks	Month	1910	Dept. of Agriculture
Corn	Bushel	Production	Year	1868	Statistical Abstract
Oats	"	"	"	"	" "
Rice	"	"	"	"	" "
Barley	"	"	"	"	" "
Buckwheat	"	"	"	"	" "
Potatoes	"	"	"	"	" "
Sugar	Pound		"	"	" "
Lumber—					
Lumber	Feet	Production Shipment	Week		Nat. Lumber Mfrs. Assn.
New Business	"	Orders	"		" " " "
Textiles—					
Raw Cotton	Bale	Production	Year	1899	Statistical Abstract of U.S. Census
Raw Cotton	"	Consumption	Month	1917	Bureau of the Census
Spindles	Number	Number active	"	"	" " " "
Wool	Pound	Consumption	"	1918	" " Markets
Active Machinery	Number	Number of spindles, width of loom	"	..	" " the Census
MINERAL PRODUCTS:					
Coal—					
Bituminous	Tons	Production	Week	1917	U.S. Geological Survey
Anthracite	"	"	"	"	Anthracite Bureau of Information
Coke	"	"	"	"	U.S. Geological Survey
Copper	"	Production, Stocks	"	"	" " "
Iron and Steel—					
Pig Iron	"	Production	Month	1883	American Iron and Steel Institute
Steel Ingots	"	"	"	1901	American Iron and Steel Institute
U.S.S.C. Orders	"	Unfilled orders	"	1910	U.S. Steel Corporation
Petroleum—					
Crude Petroleum	Bbls.	Production, Stocks	"	1917	Bureau of Mines
Gasoline	"	Total output, " "	"	1918	" " "
Kerosene	"	" " "	"	"	" " "
Lubricating, etc.	"	" " "	"	"	" " "

* In the case of certain series it may be possible to secure figures for an earlier date than that here stated.

should be made available, and what procedure could best be established for setting up the necessary compilations. In this respect, the present session would be a continuation of similar discussion at the dinner of the association in New York on December 12, 1919, at which there was general agreement:

A LIST OF SERIES NOW AVAILABLE SHOWING VOLUME OF PRODUCTION IN THE UNITED STATES—*Concluded*

	Unit	Description of Series	Period	*Available Since	Issued by
MANUFACTURED PRODUCTS: (Not listed above)					
Leather—					
Hides and Skins	Number	Raw stocks	Month	1919	Bureau of Markets
Boots and Shoes	"	Production	3 Mos.	1918	Manufacturers Assn.
Stocks	Pounds	Stocks on hand	"	"	" "
Paper—					
Pulp	Tons	Production	Month	1918	Fed. Trade Commission
Paper	"	Production by grades	"	"	" " "
Wall Paper	"	Production	"	"	" " "
Felts and Building	"	"	"	"	" " "
Railroad Supplies—					
Cars	Number	Output	"	"	Ry. Car Mfrs. Assn.
Locomotives	"	"	"	"	U.S. R.R. Admin.
Shipbuilding—					
Ships	Tons	Production, schedule	"	1917	U.S. Shipping Board
Ships	Number	Officially numbered	"	..	Bureau of Navigation
Tobacco—					
Cigars	"	Production (large and small)	Month	..	Comm. of Internal Revenue
Cigarettes	"	Production	"	..	" " " "
Chewing, Smoking	Pounds	"	"	..	" " " "
RAILROADS:					
Average miles of road operated		By companies and groups with totals for U.S.	Month	1917	U.S. Railroad Admin. Summary O.S. 5
Net ton miles			"	"	
Net ton miles per mile per day			"	"	
Train miles			"	"	
Net ton miles per train mile			"	"	
Freight car miles (loaded, empty)			"	"	
Net ton miles per car per day			"	"	
Gross ton miles			"	"	Summary O.S. 7
Passengers carried one mile			"	"	Summary O.S. 8a

*In the case of certain series it may be possible to secure figures for an earlier date than that here stated.

(a) That there should be made available current statistics of manufacturing output in a limited number of key industries.

(b) That the industries selected should be those of which the output can be measured accurately and readily in quantity or volume, as well as in value, and in which only a relatively small number of firms are involved.

(c) That statistics should be set up only for those industries desirous of coöperating in the compilations.

(d) That the statistics should be simple and that primary reliance should be placed upon statistics of shipments, supplemented by statistics of output, stocks on hand, etc., in those cases where the conditions of manufacture are such as to make the keeping of such records relatively easy.

(e) That the compilations, to be of value, must be handled with great rapidity; *i. e.*, on a basis comparable with that of the statistics of cotton consumption now prepared by the Bureau of the Census.

The chairman further stated that, in addition to the points on which there was general agreement at the New York dinner, there was a division of opinion as to the following points:

(a) As to the series to be set up, 38 ballots were collected at the close of the dinner, which established an order of preference as follows:

Automobiles	Rubber
Agricultural implements	Typewriters
Textiles	Paper
Lumber	Cash registers
Leather	Phonographs

Additional series, not covered by the original ballot, were suggested as follows:

	Votes		*Votes*
Hardware (tools, etc.)	4	Sewing machines	1
Moving pictures	2	Electric washing machines	1
Chemicals	1	Electric vacuum cleaners	1
Furniture	1	Electric farm lighting plants	1

In addition to the above, suggestions made after the meeting included:

Sulphuric acid
Electric motors

(b) As to the agency to be employed for compilation, 27 ballots favored governmental agencies, 4 ballots favored private agencies, and 7 ballots favored combined action.

(c) As to the period, 20 ballots favored monthly statistics, 12 ballots favored quarterly statistics, and 6 expressed no choice.

Dr. Warren S. Persons, in continuing the discussion, stated that the important thing was to determine the type of information that could be obtained readily and promptly. If practicable, this should cover the output, the number of employees, with changes in wages and hours, the unfilled orders and the time required to fill such orders when working at capacity. It would especially be necessary to sell the idea of the use of such statistics. Apparently the trade associations realize their value for their own purposes, but it will be necessary to bring home to them the wider value that the figures might have if regularly published for general use. As to the industries for which compilations should first be made, it was more important to establish the method than to select any particular lines of output. Almost any three or four industries would do at the start. Special attention should also be called to the importance of setting up the indices, in the beginning, on such basis that full use might be made of the possibilities of accurate

sampling. Any attempt to await full returns from each industry would delay unduly publication of the results and would largely destroy the value of the indices as current records of industrial activity and for purposes of business forecasts. The industries involved would, of course, desire to know the total output, but this could be estimated each month from partial returns and minor corrections could be made on re-publication of the figures in succeeding months. Every effort should be made, however, to maintain continuous series, using reports from the same firms each month. Supplemental reports should be used mainly for purposes of estimating total output. Variations in the number and importance of the establishments reporting should be clearly stated when the figures are published. It will be specially important in starting each series to state fully and clearly those special features of the industry and of the method of compilation employed which might affect the interpretation of the statistics. Statistics of shipments might be sufficient for some industries, but many industries stored up output during slack seasons, and this factor could not safely be neglected.

Professor Horace Secrist agreed, in general, with Dr. Persons' observations. He saw no reason for going outside of the list of key industries selected at the New York meeting. Just how many series should be set up was problematical. The necessary support for the plan could not be obtained from industrial establishments and trade associations without definite assurances that figures for individual firms would be held in confidence and that the publication of results would otherwise be properly safeguarded. Full use should be made of sampling methods, and special attention should be given to the continuity of the series. A question existed as to the possibility of getting accurate volume indices for many industries. Changing standards and grades might seriously affect the continuity of series, and much difficulty would be experienced in combining dissimilar units of output within the same industry. The storage element was also too important to be neglected. It might be desirable to use, as a supplemental index, the percentage of total capacity in operation, as revealed by the number of employees or employee hours. In some lines of output,

such as typewriters and phonographs, it might be necessary to make a distinction between output for export and output for domestic use.

The chairman stated that Professor Secrist's remarks concluded the prepared discussion, and that he would prefer to have the general discussion proceed thereafter point by point, in order that a record might more readily be made of any conclusions or differences of opinion that might develop. The plan under discussion was not at all an academic one, and if a reasonably close agreement could be reached on fundamental points, there was a very definite possibility of concrete results being obtained. First in order would be comments regarding the value of such indices as those proposed, both to business in general and to the specific industries affected.

Mr. Arthur B. Butman stated that the boot and shoe manufacturers were heartily in favor of the general plan. They particularly desired statistics as to hides and leather, but had also included provision for statistics of finished leather products in a bill now pending in Congress.

Mr. Earle Clark believed that the automobile industry, as a whole, would endorse the plan. The officers of the General Motors Corporation had expressed themselves in favor of it and Mr. Reeves, as general manager of the Automobile Chamber of Commerce, had indicated the support of that organization.

Mr. J. W. Scoville stated that the American Writing Paper Company probably would favor the setting up of statistics of paper output.

Miss Edith M. Miller felt that the banks would be particularly in favor of the plan, not only for general purposes, but also in respect to particular industries. There was much doubt as to the accuracy of existing series compiled by private agencies. Such series were much in need of investigation and test. Unfilled steel orders seemed to be affected by frequent variations in the practice with regard to the cancellation of orders. Trade practices must be definitely known before reliance could be placed on any series involving such factors.

Mr. H. N. Shenton called attention to the importance of the proposed statistics in time of actual or threatened war, or of acute industrial disturbance. Priority in transportation, coal

supply, etc., could be determined with much closer regard for the general public interest.

The chairman next called for discussion of the desirability of specific indices. There was general agreement that the industries first selected should be those comprising a relatively small number of establishments, of which the output could readily be measured in quantity or volume. It was further agreed that no attempt should be made to collect statistics from industries not generally willing to coöperate in the compilations. As to automobiles, typewriters, leather and leather products, and lumber, no special difficulties were indicated. Agricultural implements were pointed out to be subject to wide variations in seasonal and export demand. Technical difficulties as to variety of output, grades, etc., were pointed out in respect to textiles, rubber products and paper. Cash registers and phonographs were believed to promise valuable indices, but might be affected by variations in export demand, which would require special consideration. Sulphuric acid was specially favored as an index, and it was suggested that statistics for the main 60° to 66° grades would be entirely significant. Electric motors of the types used for factory drives were also believed to be deserving of consideration.

Discussion was stated to be next in order in respect to the items to appear on the schedules used in reporting output. As to this point, there was general agreement that shipments should be reported in all cases; that, where statistics of shipments were not wholly significant, they should be supplemented by statistics of output, or of consumption of some primary item of raw or semi-finished material, or of purchases of the same; that stocks on hand should be secured when practicable; that orders should be secured only when significant and when such compilation was specially desired by the industry; that labor statistics should be compiled only if desired by the industry and only in such manner as might supplement rather than duplicate the work of the Bureau of Labor Statistics; and that statistics of values should be entirely omitted.

The final discussion was with regard to the compiling agencies that should be employed.

It was agreed that, even when a governmental agency made

the compilations, it would be very desirable for the trade associations to coöperate continuously in the interpretation of the facts.

Mr. Clark believed that, while the Bureau of the Census should collect certain simple general facts regarding the whole automobile industry, the Automobile Chamber of Commerce would wish to collect more detailed facts from its own members. This point of view he thought would be held by other trade associations.

Mr. Scoville favored collection by trade associations, the Chamber of Commerce of the United States, or other non-governmental agencies. He called attention to the fact—in which the chairman concurred—that the vote at the New York meeting in favor of compilation by governmental agencies might have been reversed, if the balloting had been confined to representatives of the industries and trade associations.

Dr. Persons, while in general favoring collection by governmental agencies in coöperation with the trade associations, felt that a proper trial should be made of private agencies. He thought that the Harvard Bureau of Economic Research might be willing to undertake certain compilations.

Dr. Day emphasized the importance of obtaining the enthusiastic coöperation of the various trade associations, not only in the collection of data but also in the compilation and interpretation of the returns. He was of the opinion that sampling methods, interpretative estimation, and prompt publication—all of which had been mentioned as necessary features of the work—were more likely to be secured in a private office than in a government bureau. In view of this fact, and the prevailing attitude of business men toward the statistical work of the federal government, Dr. Day urged that every effort be made to give the various trade associations the alternative of furnishing their data to some central statistical office not under government control; such as might, for example, be set up by the Chamber of Commerce of the United States. Such rivalry as might develop between such an office and any government bureau charged with similar work for other industries would not be objectionable, but might exercise beneficial influences upon both services. Furthermore, the plan would not commit the project exclusively to either type of organization. Future

developments might be allowed to determine which form of organization promised the better statistical results.

The chairman closed the discussion by thanking the members present, on behalf of the Committee on Business Statistics, for the many helpful and constructive suggestions received. In the light of the information now at hand, he believed that the committee could undertake to secure the establishment of a few new and important indices of manufacturing output. It apparently would be desirable to divide these between governmental and non-governmental compiling agencies, being guided in this respect wholly by the desires of the industries affected. The number of new indices should be restricted to those in connection with which the most accurate results and the fullest industrial coöperation could be secured.

REPORT OF THE JOINT CENSUS ADVISORY COMMITTEE OF THE AMERICAN STATISTICAL AND AMERICAN ECONOMIC ASSOCIATIONS

To the President and Members of the American Economic and American Statistical Associations

In the autumn of 1918 it was brought to the attention of the Secretary of Commerce that events of the past few years had not tended to increase the confidence existing between the Bureau of the Census and the American Statistical Association and the American Economic Association, the two scientific organizations most directly interested in the Census Bureau and its product, but that these associations had in fact been inclined to adopt a critical attitude toward the Bureau. Accordingly, in order to restore confidence and increase coöperation and efficiency, the Secretary of Commerce with the cordial assistance and approval of the Director of the Census, on November 18, 1918, addressed an identical letter to Dr. Wesley C. Mitchell, President of the American Statistical Association, and Professor Irving Fisher, President of the American Economic Association. This letter was as follows:

November 18, 1918.

My dear Sir:

As you are doubtless aware a Bill authorizing the Fourteenth Census to be taken as of the year 1920 has passed the House of Representatives and is pending in the Senate. We have sufficient confidence in its probable passage in substantially its existing form to warrant our addressing you on behalf of the Bureau of the Census and of the Department of Commerce as below.

It is the earnest desire of the Director of the Census that the Fourteenth Census shall mark a definite advance in quality, promptness, and in the effectiveness of the work done. The legislation has, therefore, been drawn after careful study of the previous legislation, after conference with those who have taken part in earlier work of the kind and with the approval of the Civil Service Commission in the portions which fall under the purview of that body.

The step we now desire to take is to tie up the work of this census to the best scientific thought and practice as represented through your Association

and the American Economic Association. Consequently this letter is addressed to you and a letter of like tenor and date is sent to Prof. Irving Fisher, President of the American Economic Association, to request that you appoint a committee of your body to be advisory to the Director of the Census and the Department of Commerce in connection with the work of the Fourteenth Census. We suggest for your consideration a committee of three but are not particular as to the exact number save that it should be of such moderate size as to be efficient in its work.

We should deem it a pleasure, were such a committee appointed, to have it confer with the Director of the Census both before and during the work of the census itself and careful consideration will be gladly given to the suggestions such a committee might think well to make.

Awaiting what I trust will be a favorable reply, I am,

Yours very truly,

WILLIAM C. REDFIELD,
Secretary.

Upon receipt of this letter by the officers of the two associations it was at once recognized that this joint committee might be of much practical assistance to the Bureau in confronting the great task of organizing and taking the Fourteenth Census. It was also believed that in the event of successful coöperation the example and precedent of an effective advisory committee would be likely to prove of great importance to the Government in leading to similar relationships between other Government Bureaus and scientific associations or private organizations. One of the important developments of the war had been the sudden and close collaboration between the Government and scientific and industrial interests of the nation made necessary during the emergency period, and it was pointed out by men of standing, who had come to Washington solely to be of assistance to the Government, that the time was favorable for encouraging similar coöperation in connection with a recurring and distinctly peace function of the Government. It was recognized that of all the peace-time activities of the Federal Government, taking and compiling the census was the largest.

Accordingly, at the annual meetings of the two associations, both held in Richmond the following month (December 27), a cordial response was made to this request.

The Joint Advisory Committee appointed was as follows: Representing the American Economic Association, Professor

Walter F. Willcox, Professor Edwin R. A. Seligman, and Dr. Wesley C. Mitchell; representing the American Statistical Association, Professor Carroll W. Doten, Dean Edwin F. Gay, and Mr. William S. Rossiter.

Each member of the Joint Committee was considered to be especially qualified by his experience or work, or both, to be of practical assistance to the Bureau.

At the time of the appointment of the Committee, Messrs. Gay, Doten, Mitchell, and Rossiter were still engaged in war work of a statistical or economic sort, and were therefore available in Washington for service on the Committee. By an agreement between the members and the Director, approved by the Department, the other two members not then in the Federal Service were appointed special agents of the Census at a salary of $1 per annum to permit payment of traveling expenses and a small part of their living expenses during the meetings of the Committee. As rapidly as the other members retired from active Government service, which occurred between February and June, 1919, they were one by one placed upon the same basis, so that by July all were accredited as special agents of the Census without compensation.

The first meeting of the Advisory Committee was held February 10 and 11, 1919. Mr. Rossiter was elected Chairman. The Secretary of Commerce and the Director of the Census outlined the problems of the Bureau, and the Committee took up the consideration of general questions submitted to it, which naturally related to the preliminary organization of the work in anticipation of the enactment of the Fourteenth Census Law, then ready for passage by Congress.

MEETINGS HELD

Meetings of the Joint Committee have all been held in Washington. Thus far there have been seven, on February 10, February 27, March 21, April 18, May 23, June 27, and October 31. Each meeting has covered two days, so that from the organization of the Joint Committee up to the date of the preparation of this report, the Commitee has devoted fourteen working days to its task. It has been customary to hold morning and afternoon sessions on each of the two days of the

meetings and on an average twelve hours have been spent at each meeting. The meetings have been faithfully attended; at all of them at least five members were present, and at three the entire membership have been in attendance. This record of attendance was accomplished oftentimes at great personal inconvenience.

Believing that systematic conduct of Committee affairs was one essential to success, the Committee requested the Director to assign an expert statistical clerk familiar with census operations and publications to act as secretary. This was promptly done, and Miss Mary F. Griffin, an editorial expert of the Division of Revision and Results, was assigned to this service. Miss Griffin has had charge of the preparation of proceedings and various memoranda and of much of the Committee's correspondence.

In general the opening session of each meeting of the Joint Committee has been occupied with conferences with the Director, statisticians, and other officials concerned with such subjects as were under consideration. These conferences have been followed by general discussion leading to the adoption of recommendations to the Bureau, which after the close of the meeting were transmitted to the Director.

SCOPE OF THE COMMITTEE WORK

The early meetings of the Committee naturally were occupied largely with conferences with the Director or Bureau Officials concerning plans, scope of the coming enumeration, and problems of administration. While the Committee was eager to aid in any manner, in searching for the opportunity for greatest usefulness, it took the position that administrative details and policies were the concern less of the Committee than the statistical product itself—especially the method of presentation and manner of distribution. Obviously, the former task is distinctly that of the officials in charge, for which they are responsible to the President and Congress. Hence after the earlier meetings the Committee gave consideration to the administrative side of the office only to the extent of assuring itself that the work was proceeding in such a way that the product would not be impaired. Some consideration was

given (at the Director's suggestion) to the problem of securing a suitable card punch, but the Committee's advice was not accepted. (See Recommendation 27, Appendix I.) It became increasingly evident that in a careful, well worked out plan of form and content of Census published results lay the principal possibilities of Committee service. Other recommendations in considerable numbers were made and it is hoped were useful, but in submitting those relating to form and content the Committee believes that it has been able to aid the Bureau to effect real reforms.

ANALYSIS OF RECOMMENDATIONS SUBMITTED

The deliberations of the Committee took concrete form in 39 resolutions. These relate to the following subjects: Organization of personnel, 6; preliminary work in general, 3; mechanical devices proposed for use in the next census, 4; the population schedule and segregation of urban and rural populations, 6; the classification of occupations, 2 (comprising 13 subdivisions); schedules for manufacturing industries, 2; the agricultural schedules and the work of the Division of Agriculture, 4; order of publication and content of census reports, 7; methods of presentation and distribution of the results, 2 (comprising 9 subdivisions); miscellaneous, 3.

The Director of the Census welcomed the opinions of the Advisory Committee. He has extended every facility to the Committee in his power, and he expresses very earnestly his desire to secure the coöperation of the American Statistical and American Economic Associations in making the work of the Bureau most effective. To each recommendation of the Committee the Director has made response in writing. He has either accepted the Committee's judgment or has promised to give attention to the suggestions made. Of the 39 recommendations made* 17 have been substantially approved and adopted by the Bureau; 6 have not been concurred in;

* Recommendations of the Committee:

A. Substantially approved and adopted: 1, 3, 4, 6, 8, 9, 10, 13, 14, 20, 26, 7(a), 18(1), and 28 (2).

B. Approved but not finally disposed of: 5, 15, 21.

C. Not concurred in: 12, 22, 24, 29, 7(b), 7(c), and 18(2).

D. Not yet acted upon: 23, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 18(3), 28(1).

E. No specific action required: 2, 11, 17.

and 13 seem not yet to have been acted upon. Three others were of such a nature that no definite action was called for. Several of those in the unacted on group could not be satisfactorily disposed of without considerable time and thought, but the more important have practically been accepted. This group includes the recent series dealing with the general subjects of content and methods of presentation and distribution.

The space occupied by the series of recommendations of the Advisory Committee to the Director of the Census forbids inclusion in the body of this report of progress. The entire series of recommendations arranged in the order of adoption will be found as Appendix I.

CONTENT AND PUBLICATION POLICY

Reference to Recommendations 20, 30, 32, 33, 34, 38, and 39 will make evident the particular stress laid by the Committee upon the necessity for speed of publication of census material. This need appears to the Committee the more urgent in view of the long delay in publishing the results of the Thirteenth Census. To aid in securing this object the Committee, after mature deliberation, emphatically recommended that the Director adopt the policy (outlined in Recommendations 30 and 32) of omitting from the main reports practically all text and publishing the tables as promptly as practicable. It was urged by the Committee that whatever value the text prepared to accompany tables may possess—and such text is, if rapidly prepared, usually a mere repetition of figures and therefore colorless—it was outweighed by the delay occasioned in preparation and in the proof reading and printing. Thus the Committee recommended the radical change of policy shown above, according to which the tables should be published as promptly as possible by themselves and should be followed by a series of special reports upon subjects derived from census returns that were most likely to be of practical importance to the American people, prepared under the supervision of the most competent experts obtainable. Further pursuing this subject, the Committee recommended a tentative list of subjects (as given in Recommendation No. 39) and in response

to the request of the Director indicated a number of workers in statistics who would be competent to handle such reports.

In the opinion of the Committee the creation of this advisory body has been amply justified should nothing else result from their labor than the carrying out of this carefully studied and fully worked out plan of publication and separation of census reports. Too much emphasis cannot be laid upon the defects which characterized previous policies of the Bureau in these particulars. Much of the adverse criticism of the census has been due to such defects. A policy of publishing tables promptly, which means publishing results of the census at the earliest possible moment, and following these by a series of effective monographs, also published promptly, analyzing the more important census results in such a way as to make them intelligible and helpful to the largest number of people would not only afford an effective substitute for a mass of unimportant text repetition of figures, misnamed interpretative, but would mark a great step in advance in the scientific treatment of census results. The attention of the two Associations is especially invited by the Joint Committee to Recommendation 39, made at the last meeting of the Committee, and to the list of topics suggested to the Director of the Census as peculiarly timely or important. The recommendation and list are as follows:

39. The Committee desires to express gratification at the Director's approval of Recommendation 30, sections 3 to 6, advising that the Bureau should at once establish a policy of issuing special studies or monographs upon selected census topics of vital importance to the nation. It is increasingly of the conviction that these special studies are urgently needed to interpret the changes recorded in statistics of this disturbed period. The Committee further recommends that, as suggested by the Director, experts properly qualified to take up this important work under the supervision of Dr. Hill be secured at once. If called upon to do so, the Committee would be glad to coöperate by naming persons qualified to render such expert assistance.

As a tentative and partial list of subjects appropriate for such special studies, the Committee suggests the following titles:

a. Shifting of population since 1910 between sections of the country and between city and country.
b. The growth of cities.
c. The American family.

d. Foreign born population.
e. Native population.
f. School attendance and illiteracy.
g. Child labor.
h. Farm tenure, farm mortgages, and land values.
i. Total and average farm production and farm income.
j. Changes in farm crops and in live stock since 1910.
k. Effect of the war on manufactures and mining.
l. Total production in manufactures per wage earner.
m. Size of manufacturing establishments and form of ownership.
n. Integration and specialization of industry.

It was the opinion of the Committee that in publishing the results of the Thirteenth Census more emphasis had been laid upon the state than upon the subject, whereas it was felt that from the standpoint of the public and of scholars the state was a classification unit of decreasing importance and interest. This stress upon the state seemed to the Committee to be a reversion to the census practice prior to 1860, when the state was the primary unit in the presentation of census results. While it was thought that, in order to meet the local demand for statistics for individual states, it might be wise to continue the state supplement, it appeared unnecessary to incorporate all the state bulletins in the final reports. On the other hand, the Committee believed that the omission of the minor civil division table from the main reports at the last census had been a mistake, and recommended that this table should be incorporated in Volume I of the final reports of the Fourteenth Census.

For these reasons the Committee recommended collecting all the bulletins containing statistics of population, agriculture, manufactures, and mining for each state in separate state bulletins and dispensing with the final volumes by states for population, agriculture, and manufactures. The omission of these reports from the final volumes would save a large sum.

FORMAT OF CENSUS REPORTS

The Advisory Committee gave serious attention to the format of census reports and in considering this subject directed the preparation of a paper upon census publications which should review the general question of extent and cost of pub-

lications at the last three censuses and also discuss briefly the subject of distribution. This paper will be found as an appendix to the report of the Committee. The conclusions derived from the discussions of the subject are embodied in Resolution 31, and offer a complete publishing policy.

Much discussion occurred over the relative merits of the octavo and quarto size as regards suitability for the requirements of the census publications. In the Committee's opinion there was no question as to the superiority and value of the octavo size for reference and library use. The objection which has always interfered to prevent a change has been the inconvenience of readjusting census tables to the smaller size. For this reason the Committee concluded that the quarto size should be retained during the Fourteenth Census, feeling it would be unwise in the midst of the pressure and strain of the census period to undertake an experiment which might prove disastrous. The mere time and thought required for readjustment would be a distinct loss to already well advanced work. It was believed, however, that at the close of the Fourteenth Census period and with the taking up of intercensal special reports, the experiment as to the wisdom and effectiveness of the octavo as compared with the quarto size ought to be commenced. Should it prove a failure in connection with one or more minor inquiry, the embarrassment, delay, and expense would be comparatively small and would be well worth risking for the purpose of deciding upon the merits of the octavo size. On the other hand, if the latter should prove successful in connection with the minor reports, by the time the Fifteenth Census had arrived the Bureau would have reached such familiarity with the smaller size and its difficulties as well as advantages that the change from quarto to octavo, if deemed advisable, could easily be made in connection with the next census reports.

In order to reduce so far as possible the inconvenience of the larger size, the Committee urgently recommended that the paper used in the reports of the Fourteenth Census should be much thinner than has been used in reports of former censuses, pointing out the practicability and advantages of paper having a weight per ream of not more than 30 or 35 pounds, which

would reduce the weight of the volumes by at least 25 per cent. Thus the reports of the Fourteenth Census, instead of being a bulky set of volumes, would be reduced by the practical elimination of text and the omission of certain state reports and still further by the use of thinner paper to a series of thin volumes easily handled and requiring comparatively little shelf space. This would be a boon to users and to libraries all over the country which should lead to the preservation of census reports where in the past their bulk has frequently prohibited their permanent retention. The Committee further advised the publication of a limited number of the Fourteenth Census reports on all rag paper for permanent library preservation.

CHANGE OF DATE OF CENSUS

At the date of the first meeting of the Committee, held February 10, 1919, the new law covering the taking of the Fourteenth Census was being crowded through Congress during the last days of the session. This bill passed the Senate on the last day of February, passed the House on the third day of March, and was signed by the President on the same day. Had it been possible to propose amendments, the Committee might have advised fundamental changes in Census inquiries and hence in schedules. By the time the Committee was organized, however, the bill had advanced too far to permit any consideration of its provisions. The new law directed a radical change in the date established for taking the Census. All of the censuses prior to 1910 had been consistently taken as of June first, but in order to meet changing conditions in cities due to the departure of large numbers of persons to the country by June 1, the date of the census of 1910 was changed to April 1. As this provision proved unsatisfactory for securing agricultural returns, January first was established in the new law as the date for taking the Fourteenth Census. When the subject was discussed at the hearings before the committees on the census of both Houses, arguments in favor of the change, especially the advantages resulting from a much more satisfactory date for agricultural statistics, were regarded by the Bureau as outweighing the disadvantages. This was perhaps one of the provisions upon which, had the Committee

been in existence earlier, it might have advised a different decision, since the brief references to this subject which were made at the first meeting of the Committee developed considerable skepticism as to the wisdom of the change of date. Aside from the practical aspects of the problem there will be a persisting error in consequence of this change due to the fact that the average user of statistics will make direct comparisons between the Fourteenth Census and the Thirteenth, Twelfth, or any other census without allowance for differences in the dates or in the length of the intercensal periods. A greater objection, however, has developed already in that the change in date from April to January is tending to embarrass the Bureau, by adding to the cost of enumeration and by causing delay owing to the difficulties of travel in the midst of winter. It thus increases the burden upon officials already overburdened with the great task of taking the census.

THE ASSISTANT DIRECTOR OF THE CENSUS

At the request of the Director of the Census the Committee made an effort to advise in the selection of an Assistant Director of the Census to be appointed when the Census Act took effect July 1. Many names were suggested, but it was found that every one of those who were proposed by the Committee was fully occupied elsewhere and unable to give consideration to the claims of the Bureau. Subsequently the Department and the Director decided to invite Mr. Wm. M. Steuart to become Assistant Director of the Census. Being familiar with his excellent previous record as an official of the Census for many years and having confidence in his ability to fill the position satisfactorily, the Committee gave cordial approval to the nomination. Mr. Steuart began his work early in the summer and, with his knowledge of and experience in census work, has proved an invaluable acquisition to the Bureau in preparing for the Fourteenth Census. The position of Assistant Director of the Census has always been a very difficult one. It is a temporary position which involves supervision of permanent officials and employees.

CENSUS DEFECTS

In presenting this report of progress it is appropriate to refer to certain phases of census problems which have impressed the Committee.

Some lack of foresight and organization was shown by the Department of Commerce in arranging for temporary accommodations in connection with the Fourteenth Census. According to the final adjustment, the administrative offices remain in the permanent quarters of the Bureau in the Department of Commerce Building at 19th Street and Pennsylvania Avenue, but the entire producing force, soon to number several thousand clerks, is located in part of a temporary war building at 6th and B Streets, a mile and a half away. It is difficult to exaggerate the inconvenience and waste entailed by such an arrangement. All divisions of the Bureau should be under one roof. It ought to be managed as an independent unit during the decennial census emergency. If this could not have been done, one of the war buildings nearer the Department should have been secured.

Possibly, in passing, the Committee may be allowed also to criticise weakness shown by the Bureau itself in delaying to begin in proper season preparations for the enumeration. Little was done until the Assistant Director was appointed and took office. This resulted in pressure and some delay. It should be noted, however, that the period intervening between the date when the decennial census appropriation became available and the date of the census is three months shorter than at the last census and six months shorter than at the Twelfth Census.

Organization for the immense task of handling the field work and correspondence of the Population Census was also poor. At least one of the Bureau divisions when next confronted by a decennial census enumeration should be completely reorganized by distribution of duties on the principle of modern business organizations of large magnitude. These, however, are details of administration for which the officials of the Department or Bureau naturally are responsible and were not and ought not be within the sphere of an advisory committee.

PECULIAR PROBLEMS OF THE FOURTEENTH CENSUS PERIOD

No Director of the Census in the past in undertaking a decennial enumeration has been confronted with such problems of scarcity of labor and cost of work as have fallen to the lot of the present Director. Instead of receiving an excess of applications for employment on census work, he has encountered great difficulty in securing suitable supervisors and still greater difficulty in securing satisfactory enumerators in sufficient number. For the first time it has been found necessary to utilize the services of women in the latter activity. There are many localities in which the roll of the enumerators is still incomplete. To progress as far towards completing the quota as has been done, the Bureau has been compelled to use the maximum compensation allowed by law for the payment of enumerators. It should be remembered, however, that the addition of only one cent to the per capita compensation allowed enumerators for taking the census represents an aggregate extra cost of more than one million dollars. At the outset the Committee gave some attention to the matter of supervisors, and received the assurance of the Director that it was the policy of the Bureau to secure the best possible men without consideration of political affiliations. The Committee did not expect to insist on securing perfection, but has been entirely content if, with its advice and encouragement, the Bureau has made progress in improving the personnel of supervisors. The subdivision of Massachusetts into eight supervisors' districts in substitution for one in the past was criticised by the Committee and defended by the Director as being in the interest of better administration. Since he was charged with responsibility for the conduct of the census the Committee made no further criticism, feeling that he was the best judge of an operation for which he was himself responsible.

INCREASING DEMAND FOR CENSUS INFORMATION

The occurrence of the war greatly stimulated the demand for information of a statistical character relating to all manner of subjects. Much of this increased demand was a healthy growth indicating the increasing value of statistics in con-

nection with all manner of activities. Hence, certain new inquiries ought to be encouraged. There should be, for example, a complete and accurate commercial census. A wealth of information and a vast store of statistics relating to department stores, drug stores, groceries, and all other leading trade activities could be secured, for which already there is an insistent demand. The Committee has received appeals from a number of sources to advocate the preparation of such data. There is also a demand for greater detail or more frequent enumeration in connection with inquiries which are already authorized, such as those concerning specified important industries and certain agricultural products and operations.

On the other hand, the Director of the Census, while confronted with such demands, finds his own problems of administration greatly increased even though he confine his activities to exactly those which have been customary and long authorized by Congress; he must enumerate a steadily increasing population. He is, indeed, about to include in the census of 1920 at least twenty-five million more people with all their varied characteristics than did the Director of the Twelfth Census in 1900. This means an increase in twenty years of practically one-third in the magnitude of the task. He must secure an army of nearly one hundred thousand persons to aid him, when labor cannot be obtained easily for any known operation, public or private, except at greatly increased compensation; yet the pay which the Census Bureau offers is moderate in the extreme.

In the opinion of the Committee the time is not far distant when the detail which it has been customary to offer in connection with the census of the United States must be sharply curtailed because of the mere magnitude of the task due to the growth of population and industry. It would be wise to recognize this fact and begin at an early date after the completion of the Fourteenth Census a careful and systematic study of the directions in which this curtailment can be applied. First, attention must be given to a number of tables, so as to secure a reduction which will cause the least loss and embarrassment to the users of statistics. It is evident that the great increase in cost which will unquestionably characterize the Fourteenth

Census in common with every other operation, public or private, at this period, if it persists, will tend to hasten curtailment at some point.

PRACTICAL USEFULNESS OF THE ADVISORY COMMITTEE

Ten months have now elapsed since the organization of the Advisory Committee and hence the beginning of its active coöperation with the Director of the Census. During this period the members have gladly contributed their time and best thought to the meetings. The actual cost to the Government has been very small, covering only such traveling expenses as have been incurred, and a small part of the living expenses of members during meetings. The total outlay for a full year of Committee activity will be considerably less than $1000. What return has the Bureau received for this investment and the time devoted by its officials to the demands of the Advisory Committee? Are there any concrete results to show for its labors? In short, has this Joint Advisory Committee advanced the cause of closer coöperation by proving to be of real service?

The Director of the Census sums up his impression by saying that the work of the Committee thus far has been of much service to him. He expresses the opinion that the members have formed an expert cabinet to which he was able to refer problems and from which he was certain to secure impartial advice.

The Assistant Director says that the impression he has received from his own brief observation and the comment of others has been that the Committee has keyed up the officials of the Bureau and steadied and encouraged them by forming an expert court of the last resort. Finally, the members of the Committee themselves, who have given their time, frequently at much inconvenience, feel that it has been and is an experiment worth while. To have advised and persuaded the Bureau to change the content policy with regard to census reports alone will mark a great advance and, by the omission of text, should effect the saving of a large sum.

Obviously the value of such an advisory body depends largely upon three essentials—knowledge of the subject, faithful

consideration, and attendance. In those three essentials the Joint Advisory Committee of the two Associations has not been lacking. The Committee has pointed out to the Director with much earnestness that he might make his administration noteworthy and of especial service to the Federal Government and to the country by adopting such reasonable and far-reaching reforms in content and mechanical form as have been outlined. His response has been very cordial.

The Committee has pleasure in reporting that during its brief existence it has conducted correspondence with representatives of various independent organizations which have written to the Committee for information or assistance. Among these was the Chief of the Statistical Office of the Dominion of Canada, who submitted a copy of the Canadian Statistics Act and of the Regulations thereunder and expressed a desire to keep in touch with the Committee and receive any reports that it might issue.

The future work of the Advisory Committee doubtless will be comprised in occasional meetings, probably less frequently held, during the coming year, to pass more in detail on form and content, and to advise on special reports, or other subjects, as the opportunity for service develops.

FOR THE AMERICAN STATISTICAL ASSOCIATION:
WILLIAM S. ROSSITER, *Chairman*,
CARROLL W. DOTEN,
EDWIN F. GAY.

FOR THE AMERICAN ECONOMIC ASSOCIATION:
WALTER F. WILLCOX,
WESLEY C. MITCHELL,
EDWIN R. A. SELIGMAN.

APPENDIX I

Recommendations Made to the Director of the Census by the Joint Committee of the American Economic and the American Statistical Associations to Advise the Director of the Census

1. It is the sense of the Committee that the construction of schedules is a technical task which in the first instance should devolve upon the chief statistician responsible for that inquiry. After each of the important schedules has been drafted, the chief statistician should be authorized and expected to secure the assistance of recognized experts to criticise the draft and suggest changes.

2. The Committee does not consider its function to be that of a detailed study and analysis of schedules, but it is prepared to examine the schedules submitted and to express an opinion upon the larger questions involved.

3. We recommend that each of the special schedules of manufactures should be reviewed and criticised by one expert or more familiar with that industry, to whom a draft of the schedule should be submitted and who then should be invited to come to the Census Bureau for a conference.

4. We believe that the Division of Agriculture is inadequately provided with clerks qualified to help in planning and preparing for the Fourteenth Census and that steps should immediately be taken to supply this deficiency. At the earliest practicable moment the chief statistician for agriculture should be allowed to secure a group of expert special agents to assist in advance organization and training.

5. The Committee is impressed by the fact, dwelt upon by all the officials who conferred with it, that the reduction of three months in the period before the beginning of the enumeration increases the need for the speedy development of plans and for the corresponding reorganization of the office force. Hence, in their opinion, the greatest immediate need of the Census Bureau is for additional experts in the divisions responsible for the coming enumeration to enable the chief statisticians promptly to perfect their organization.

6. The Committee requests the Director to instruct Dr. Hill to prepare for its use a memorandum embodying the following facts:
   - A. The successive stages in the organization of the last one or two censuses showing the building up of the personnel and the method of selecting appointees.
   - B. Costs distributed by districts and branches of work.

7. The Committee approves the tentative population schedule as submitted with the exception that it makes the following recommendations:

A. That columns 10 and 11, headed "Whether blind (both eyes)" and "Whether deaf and dumb," be omitted from the schedule, inasmuch as the information can and will be secured by enumerators on a special slip.

B. That either column 20, headed "Whether able to read," or column 21, headed "Whether able to write," be omitted. The Committee would leave the choice to the Census authorities, but it expresses the opinion that the question as to ability to read is the more important.

C. That an extra subcolumn be added under column 22 asking the "locality of birth."

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8. The general schedule for manufactures as used at the census of 1914 is approved. The Committee reaffirms its recommendation that each of the supplemental schedules of manufactures should be submitted to the criticism of expert representatives of the several industries, but would like to have the privilege of final consideration of the schedules after their revision.

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9. It is the opinion of the Committee that the number of separate inquiries in the schedule of the Census of Agriculture should not exceed 400. It recommends the immediate temporary appointment of a special expert to undertake such revision at once in coöperation with Mr. Austin, and that the report of this conference be prepared for the consideration of the Committee at its next meeting.

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10. The Committee requests the Director to assign some competent person to the task of preparing for its information a time schedule for all the divisions covering the preparation, enumeration, tabulation, and publication of reports for the Fourteenth Census and stating the clerical and material requirement at each step necessary to complete the census within the time prescribed by law, the same to form an orderly and coördinated statement of census operation and need. The attention of the Director is invited by the Committee to the fact that certain important memoranda have already been submitted to the Committee through the Director, which could form the beginning of this work.

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11. It was voted that hereafter the first business taken up by the Committee in assembling for a series of meetings shall be the reports of subcommittees and also to hear from the Director what disposition, if any, had been made of recommendations submitted to him as a result of the deliberations of the Committee at the preceding meeting.

12. The Committee has carefully considered the paragraph in the Director's letter of March 20 dealing with its suggestion that one of the two questions on illiteracy be omitted. We agree that it is important to preserve comparability with similar returns at earlier censuses but doubt that this consideration should be given decisive weight because—

A. Illiteracy returns are subject to more error than we had thought, as is shown by the experience of the army in dealing with this problem.

B. An estimate of the number unable to write from the number reported unable to read would probably be almost if not quite as near the truth as an enumeration.

C. While in 1900 the answers to both questions were tabulated, in 1910 only those unable to write were tabulated. The original suggestion of the Committee thus involved nothing more than omitting from the schedule a question of which no use seems to have been made in the tabulation of 1910.

In view of this situation the Committee continues in favor of omitting one of these questions and believes that it would be better to retain only the question "Whether able to read."

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13. The Committee approves the changes made in the agricultural schedule but refers the matter to Professor Doten to confer with the Chief Statistician for Agriculture with regard to further reductions or duplications. It approves as final any conclusions reached by them.

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14. The Committee invites the submission of an outline of the plan of organization for the Fourteenth Census referred to in the last paragraph of the Director's letter of March 20 and would be glad to receive this in advance of the next meeting in order that each member may examine it before it is brought up for consideration at the meeting.

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15. The Committee has considered the memoranda of Dr. Hill and Mr. Hunt on the problem of separating urban and rural population, notably in three New England states, one of which is New Hampshire, and has submitted these to a prominent member of the New Hampshire legislature for an opinion. Based upon the memoranda and response the Committee makes the following recommendation:

That the Census Bureau undertake to differentiate within New England towns the unincorporated villages from the outside rural population under rules stated below:

A. In towns where village districts have been defined under the statutes for purposes of lighting, taxation, etc., the boundaries of these districts should be regarded as the limits of the village.

B. In other towns the selectmen should be requested by the Bureau of the Census to define the boundaries of villages within the limits of the towns so that enumerators can recognize them.

C. In towns in which no village districts have been defined and in which

the selectmen fail to respond to the request of the Bureau, enumerators should be instructed to regard the village as extending to that point along any road leading out of the village at which the distance between any house and the next house beyond exceeds 300 feet.

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16. The Committee has inspected the mechanical equipment of the Census Bureau and has discussed the results of its observations. It was struck by the unequal development of the devices for the three stages of mechanical tabulation of population returns—card punching, sorting, and counting. Of these devices that for punching is still unsatisfactory, while the other two have been brought to a high state of perfection. The Committee urgently recommends that the antiquated pantograph punch be utilized only as a reserve and as a last resort and that steps be taken at once to summon to conference technical experts to undertake the task of making the existing automatic punch or a development therefrom a practical and effective power punch for use at the coming census. It is the confident hope of the Committee that energetic effort will overcome existing defects in such machines. It may even be possible to secure the development and manufacture of an entirely new machine if it proves to be desirable. The Committee recommends that no effort be spared to secure the improvements indicated. The Committee is convinced that considerable outlay in perfecting an automatic punch would be fully justified by ultimate economy.

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17. The Committee approves the method of ascertaining the limits of unincorporated villages in certain New England states set forth in the memorandum of Messrs. Hill, Hunt, and Sloane and expresses the opinion that they have worked out this problem satisfactorily.

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18. In view of the new and very interesting evidence submitted to the Committee with the Director's letter of April 17 and showing the probable advantage of retaining both questions on illiteracy and tabulating the answers, the Committee now withdraws its original recommendation that one of the two questions be omitted and substitutes therefor the following:

A. That both questions be retained, the answers to both tabulated, and the results published.

B. That efforts be made through special studies in certain small areas and by comparisons with other returns to check the accuracy of these answers and to ascertain the probable error of the census figures.

C. That a special report on illiteracy based on this material should be prepared by the Bureau of the Census and published as soon as may be after the main reports appear.

19. The Advisory Committee has considered with interest the explanation of the Director of the Census concerning the status of devices available for punching cards required for the Fourteenth Census and has witnessed the test now in progress at the Bureau of the Census of three machines owned or controlled by the Bureau and of one submitted by a private corporation. It has also inspected the operation of certain proprietary devices adapted to such purposes in use at the Interstate Commerce Commission and at the Bureau of Internal Revenue.

The Committee recommends:

A. That following the precedents established at earlier censuses the Director of the Census appoint a commission to supervise a systematic test, upon which commission, in order to forestall criticism, one member at least should be an expert not connected with the Department of Commerce.

B. That the Powers Accounting Machine Company and any other concerns having mechanical devices adapted to punching census cards should be invited to submit their devices in competition.

C. That for the test herein recommended certain rules should be formulated which should take into account experience and differing adaptability of clerks employed.

D. In view of the fact that the punching device is far behind the tabulating and sorting machines in point of development and that this device is of vital importance, sufficient time should be allowed for a thorough test.

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20. The Committee believes that the results obtained from the schedules of population, agriculture, manufactures, mines and quarries, and forest products available for publication should be classified as to their sequence of completion in order that a plan for publication can be formulated in advance which will enable the presentation in the printed page of the results of the census as promptly and systematically as possible. To this end the Committee requests that a statement be prepared and submitted to it by the various divisions as to the expected sequence and probable time of completion of the material here specified.

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21. The Committee transmits herewith to the Director of the Census a copy of a letter dated April 5 from Mr. Malcolm C. Rorty, Chairman of the Committee on Business Statistics of the American Statistical Association, with a copy of a letter which accompanied it. The Committee approves in general the proposal set forth in the correspondence noted, but suggests that in working out the classification of industries for which statistics are to be secured pains should be taken to see that it is coördinated as far as possible with that of the Price Section of the War Trade Board, now in process of transfer to the Bureau of Internal Revenue, and with the classification in use by the Federal Reserve Board.

22. The attention of the Committee has been called to the fact that the division for collecting price statistics of the War Trade Board, which has performed a function generally recognized as exceedingly important, is about to be taken over temporarily by the Bureau of Internal Revenue and that officials of that Bureau would be entirely willing to see it transferred to the Bureau of the Census permanently. The Committee believes, and has already publicly so stated, that this division belongs properly to the Census as a part of its permanent organization. If this opinion meets with the approval of the Director of the Census, the Committee recommends that the Director make such representations to that end to the Secretary of Commerce and the Commissioner of Internal Revenue as may be necessary. The Committee further offers its services to the Director in securing any legislation that may be required to effect a transfer.

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23. The Advisory Committee welcomes the Director's statement of May 19 that he would "not be averse to . . . testing the accuracy of the illiteracy statistics, especially if some simple, effective, and inexpensive way of doing it can be suggested." It believes that if in certain small areas, for example, near large universities or associations especially interested in conditions in their vicinity, the names and addresses and illiteracy returns for every person over 10 years of age should be placed in the hands of students of statistics or other volunteers for verification not long after they were gathered, much light upon the probable error of the returns could be obtained from these random samples of the population. If this suggestion should commend itself to the Bureau, the members of the Committee would be glad to coöperate in its execution.

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24. The appointment clerk should be a real employment manager and should have full charge of all matters pertaining to the hiring, training, promotion, and welfare of the personnel of the Bureau. A strong, able, and experienced man or woman should be secured for this work.

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25. The Committee has examined the correspondence with the Powers Accounting Machine Company and has conferred with the Director concerning the test now in progress of punching machinery and concerning his plans for selecting mechanical equipment for punching the population cards of the Fourteenth Census. It is the opinion of the Committee that the method so far employed by the Bureau may fail to insure that the most efficient device will be secured for the purpose specified. It is perhaps unnecessary to repeat that the Advisory Committee is in no way concerned with the success of any particular competitor, but is vitally concerned, and feels to some extent responsible, that the most efficient mechanical equipment possible shall be secured to carry on the work of the Census.

A. We approve the policy of the Bureau to have ample reserve of pantograph and key punches for use in the event of failure to secure a more effective device.

B. We recommend that, having such reserve provided in ample season, the Director invite the Powers Accounting Machine Company, in response to their letter of May 13, and any other concern capable of submitting a suitable punch, to construct and submit at their own expense and risk an improved punch or punches at the earliest practicable date (even as late as September 1, 1919) which shall then receive a prompt and thorough test. In the event of the evident superiority of any one of the devices thus submitted over the punches in reserve, the Committee recommends that the successful machine be adopted, but if because of time limitation a sufficient number of such machines can not be constructed in season to punch all the population cards, that as many machines be ordered as can be secured in season for use to supplement the pantograph or other punches actually available and in use.

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26. *Resolutions concerning the classification of occupations.*—Because of its doubt about the character of the returns that will be made by the enumerators the Committee favors a rather conservative policy in the classification of occupations by the office force. The following recommendations are submitted for consideration.

A. That the extraordinary difficulty and the pressing importance of securing better occupation returns be called to the attention of the Director of the Census as a special reason justifying his effort to secure a more efficient corps of supervisors, inspectors, and enumerators than the Census has had heretofore.

B. That in preparing the Instructions for Enumerators full use be made of the experience of the Thirteenth Census in an endeavor to guard against the commonest errors in reporting occupations.

C. That emphasis be put upon the importance of making accurate returns of occupations in the preliminary training given to enumerators.

D. The Advisory Committee urgently recommends that the practice of inspecting schedules in the offices of the supervisors before they are sent to Washington be systematized and extended. By way of tentative plan we suggest that there be selected from the staff of each supervisor one or more inspectors of schedules and that these men be given special preliminary training in the performance of their duties. Wherever physical conditions permit, each enumerator should go over at least his first schedule with an inspector who should pay especial attention to the occupation returns. Further all schedules should be examined and approved by inspectors before they are accepted by the supervisors from the enumerators.

E. That Mr. Edwards' plan of elaborating the standard classification of occupations by increasing the number of entries from the 428 used

in Tables I–III of the report on Occupations issued in 1914 to about 600 be endorsed.

F. That as far as possible the changes made in this elaboration of the occupations classification should be so made as to keep the occupation statistics of the Fourteenth Census comparable with the corresponding figures of the Thirteenth Census.

G. That in classifying occupations the controlling criterion shall be the kind of work done: for example, greenhouse laborers, locomotive firemen, commercial travelers, carpenters, stenographers and typewriters.

H. That no separate classification by industries as in Table VI of the Thirteenth Census volume on occupation statistics be attempted; but that the information concerning the industry be utilized when appropriate to aid in forming a judgment concerning the kind of work done.

I. That, if possible, all the occupation returns be classified by a specially-trained force before cards are punched.

J. That in the report on occupation statistics an effort be made to analyze the tables thoroughly, and to present figures for the whole country and for broad geographical sections, if not for states and large cities, in which the persons following the 600 occupations recognized are classified according to

Literacy.	Country of birth or mother tongue.
Marital condition.	Class of worker—whether employer, employee, or working on own account.
5-year age groups, and single years up to 18 or 20.	

There is some doubt about the value of the last-mentioned cross classification. The Advisory Committee would be glad to know what the staff of the Census Bureau thinks upon the subject.

K. That it is desirable further to have this general analysis supplemented by intensive studies of the occupations of special groups of persons, such as the following:

Blind and deaf.	Women.
Illiterates.	(Children, under 15 years of age.)
Negroes.	(Young persons, 16–20 years of age.)

27. The Committee regrets that it cannot concur in the conclusions of the Bureau in connection with the development of punching devices or with the policy indicated in the Director's several rejoinders in response to Resolution 25 and previous resolutions on the subject. The nature of the rejoinders has convinced the Committee that it cannot render service by further recommendations on the subject.

MEMORANDUM TO ACCOMPANY RECOMMENDATION 27

In connection with recommendation number 27, the Committee desires to restate the facts which inspired the recommendations concerning card punching devices which it has submitted to the Bureau.

In 1890 the device used by the Census Office to punch the population card was a simple pantograph makeshift hastily invented by the inventor of the tabulating machine to supply an accurately punched card. The defects in this punch were small product, double punching, separate gang punching, and physical strain upon the operator.

During the decade which followed the inventor concentrated his effort upon improving the tabulating machine, and the rudimentary pantograph punch was again used at the Twelfth Census (1900).

During the succeeding decade (1900–1910) the patent rights on the tabulating devices expired and the Bureau set about developing a tabulating machine of its own and a motor driven punch. These machines were used to tabulate the Thirteenth Census, but for various reasons, one of which was hasty contract construction, the motor driven punch, known as the Powers punch, proved unreliable and a large part of the population cards of the Thirteenth Census were again punched with the old pantograph hand device.

When the Advisory Committee began its work it was informed by the Director of the Census and the Chief Clerk that the Census had further developed the tabulating and sorting machines to a high degree of efficiency, but that the Bureau was beginning a test of punching devices adapted to punch Fourteenth Census population cards. The competing machines were to be as follows:

a. A Powers punch repaired for the test by the Bureau of Standards.
b. An original pantograph punch.
c. A pantograph punch reinforced by a self-feeding and locking device.
d. A key punch submitted by the Tabulating Machine Co. (necessitating a different arrangement of characters on the card).

The Committee inspected this test shortly after it began. The members felt that none of the machines included in the competition was adequate and that the test was likely to be misleading and unsatisfactory. This impression was strengthened by the fact that when the Committee asked why the Powers Company, which manufactures punching and tabulating devices based on the Census motor driven punch, had not been invited to compete, ignorance of the Company's whereabouts was professed, but by using the telephone the Committee secured the presence at their meeting of a representative of the Powers Company within half an hour.

Consideration of this problem by the Committee resulted in these conclusions:

a. While great progress had been made in the development of Census tabulating and sorting machines, none had been made in machines for punching population cards if no substitute were now available for the pantograph hand punch of thirty years ago. The members further believed that the defects in this device were so obvious that good administration required definite improvement before the Fourteenth Census.

b. The proposed test included only one machine which was offered in good faith (the key punch). The other three devices were two pantographs competing against each other, and a defective Powers motor punch not capable of service without radical change.

c. The Committee also criticised the organization and conduct of the test, and felt that for the reasons noted, broad conclusions therefrom would be of small value.

Accordingly they recommended immediate conference with the Powers Company, and any other concern capable of offering a punch superior to those submitted, and the energetic application of the

resources of the Bureau to develop a punch which would increase product, reduce error, and facilitate operation.

The responses of the Bureau to the Committee's recommendations have been such as to lead to the comment with which this rejoinder begins.

The Committee concludes its references to this subject by expressing the opinion that the Bureau is and will continue to be open to grave criticism as long as it utilizes for the great task of punching the cards of a decennial population census a slow and painfully operated device, thirty years old and admittedly only a makeshift when it was originally constructed.

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28. The Committee notes with gratification the Director's substantial acceptance of its various recommendations regarding occupation statistics. The only comment it wishes to add concerns the statistics of occupations of young persons by single years.

The Committee recommends:

a. That the occupations of workers under 16 years of age by single years, which were tabulated but not published at the Thirteenth Census be published in the Fourteenth Census reports.

b. That corresponding statistics based on the returns for 1920 be extended, if possible, to embrace all workers under 18 years of age. Reasons for this recommendation are the growing importance of and interest in

a. Vocational training.
b. "Blind alley" occupations.
c. State regulation of part-time employment of young persons (many states now have laws of this character applying to all persons up to 18 years of age).
d. The desirability of facilitating comparisons of this character at future censuses.

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29. The Advisory Committee has given careful consideration to the Director's statement of June 24 relating to Resolution 24 adopted at its meeting of May 23–24 and it is the opinion of the Committee that, owing to the brevity of this resolution, the Director did not fully understand the Committee's intent. It therefore desires to repeat its recommendation in greater detail as follows:

a. That a personnel office be organized.

b. That this office be under the charge of a well trained expert, experienced in the duties of employment management.

c. That this employment manager be placed under the direction of and made responsible to the Chief Clerk in the conduct of his office.

d. That the employment manager be given control of the following branches of work:

a. Training and promotions.
b. Efficiency and service records.
c. Vacations and leaves of absence.

d. Health and sanitation.

e. Housing, lunch room, and recreation facilities.

There should be a rest room and dispensary in charge of a physician and a nurse. The physician would not need to be in constant attendance, but a competent trained nurse should be on duty at all times when any considerable number of employees of the Bureau are at work.

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30. The Bureau of the Census is allowed by law three years in which to take the Fourteenth Census, tabulate the returns, and publish the results. The Advisory Committee is strongly of the opinion that a great opportunity is offered to the Bureau of the Census to complete the operation in less time than the three year period. Next to accuracy, speed in completing and publishing the results is the greatest service which the Bureau can render to the country. To facilitate this important result the Advisory Committee recommends:

a. That the results obtained from successive runs of the cards or from handling the schedules be published in bulletin form immediately after they have been secured, without delaying for the purposes of rearranging the material, including numerous percentage tabulations, or of inserting text beyond what is needful to make clear the meaning of the words and figures.

b. That the bulletins thus issued be combined into final volumes with the greatest possible speed, and to that end with the minimum amount of changes in tabulation matter and little, if any, extension of text.

c. That plans be adopted at once for a series of special studies dealing with the various census topics and interpreting the latest census figures in the light of similar figures of earlier dates and other relevant matter.

d. That after the subjects of these studies have been determined, the best qualified experts should be secured to undertake them, in coöperation with the regular staff of the Bureau. The resources of the Bureau should be at their disposal so far as other demands make possible. Their preliminary work on such studies should begin at an early date.

e. The supplementary studies recommended in paragraphs 3 and 4 should be published as bulletins if feasible, and finally combined into volumes to form the closing issues of the Fourteenth Census reports.

f. That a careful study should be undertaken at once to standardize tabulations with a view to comparability, and to avoid duplications and inconsistencies in the tables of the Fourteenth Census. The Committee believes that this study and its resulting recommendations will prove of far-reaching importance to the Bureau, and earnestly recommends that arrangements be made at once with a competent expert to undertake this work.

31. *Recommendations relating to the Decennial Census publishing policy of the Census Bureau.*

After consideration of the following review of census publication operations, the Committee submits the following recommendations in connection with Fourteenth Census publications:

a. Publications of the Fourteenth Census should consist as at the Twelfth and Thirteenth Censuses, of bulletins giving advance announcement of the results of the enumeration; final reports presenting the results of the census in permanent form; an abstract to summarize and popularize census facts; and monographs or minor volumes on special census subjects.

b. The mailing list of the Census Bureau for the distribution of bulletins and final reports or volumes of the Fourteenth Census should be established by preliminary inquiry and should include:

a. Libraries containing more than a specified number of volumes.

b. Workers in statistics in colleges, universities, and schools, and in private life whose interest is enlisted to that end, such persons including the membership of the American Statistical Association, American Economic Association, American Sociological Society, American Public Health Association, National Association of Manufacturers, and other similar organizations.

c. Certain Federal, state, and municipal officials.

d. Names of persons submitted by senators and representatives (not to exceed approximately ten names of citizens or organizations to each such official) conforming to certain standards of interest in statistical research expressed in response to inquiry by the Director of the Census as to their desire to receive Census publications.

e. A limited list of clubs and institutions, such as Chambers of Commerce and Boards of Trade, responding to appropriate inquiry.

f. A special list in each state to which only bulletins relating to the state are to be sent.

The circular letter of inquiry should list and describe the bulletins and final volumes explaining especially the value and cost of the latter, inviting legitimate requests for any or all of the publications. The mailing list for both classes of publications should be such as to secure wide and effective distribution.

c. The mailing list for the abstract should be that established in paragraph (2), with such additions as may prove advisable because of the popular character of the publication.

d. Bulletins should be printed on machine finish paper of standard weight. Volumes should be printed on thin paper of good quality not exceeding 30 or 32 lbs. per ream of 25 x 38 size. By following this policy the weight of a volume approximating 1,200 pages would not exceed five pounds.

e. A certain number of copies, possibly 1,000, should be printed on paper which will show little effect from the passage of time, such as all rag

or Japanese parchment. These copies should go to Government depositories and to Government offices and important libraries.

f. The binding of the final reports and of the abstract of the Fourteenth Census should be in dark brown cloth stamped in aluminum.

g. To the end that all possible saving of time may be effected, it is recommended that practically all so-called interpretative text be omitted from the bulletins and reports of the Fourteenth Census and that no text be printed in the bulletins and final reports that is not needed to clarify tables or to prevent misconstruction of figures, and that all interpretation be reserved for special studies.

h. The Fourteenth Census abstract should be of octavo size printed on thin paper and should contain not only decennial census data but other figures derived from intercensal investigations sufficient to make the volume a complete record of recent census results. The Committee recommends that the Director of the Census secure the services of an expert in such compilation at an early date, to follow census publications closely so that the abstract may appear at the earliest practicable date after completion of census returns.

i. Rigid economy should not be the first consideration in connection with the presentation and distribution of Fourteenth Census publications. Instead the first consideration should be a reasonably wide distribution of results. To avoid all extravagance, to secure estimates, and to conduct census publishing with prudence and intelligence is, as a matter of course, assumed to be essential to good administration. But the desire to hold down publication expenditures to some arbitrary figure should not be permitted to stand in the way of the larger objective of distributing the decennial account of stock of the nation in reasonably generous fashion to the American people.

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32. The Committee reaffirms its recommendation to omit from bulletins and reports to be published within the decennial census period all text not required to explain or qualify tables. This restatement is based upon the increasing conviction that speed in securing and publishing the results of the Fourteenth Census so far as it is consistent with accuracy is the most important objective to be secured. To that end the results of the population census should be published in bulletin form in the order in which the successive runs are completed without delaying for the rearrangement of tabular matter or the preparation of text.

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33. The Committee recommends the publication of state bulletins giving the population by minor civil divisions as rapidly as the completion of the data permits. The entire minor civil division table should be subsequently incorporated in Volume I, in accordance with the uniform practice prior to 1910. The series of minor civil division bulletins should be followed by other series of topical population bulletins

presented by states or groups of states substantially in the order of the tabulation.

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34. The Committee recommends that the statistics of agriculture be tabulated by topics and that the first tables prepared and published be those relating to farm acreage and values and the second those relating to farm crops and live stock on farms.

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35. The Committee approves the Division of Agriculture's policy of including returns of farms located within city limits in the agricultural tables for the county in which the specified city is located.

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36. The Committee recommends that if the Census Bureau regards it as advisable to use for any geographical unit crop values obtained in the form of averages from the Department of Agriculture the results be shown by counties. The Committee is inclined to believe that if the Department of Agriculture plans to publish crop values in any detail, the publication of these same figures by the Census would tend to duplication and might be unwise.

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37. The Committee further recommends that all bulletins containing statistics of population, agriculture, manufactures, and mining for each state should ultimately be brought together in separate state bulletins and that a limited number of these bulletins should be bound as volumes for distribution to depository libraries.

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38. The Committee recommends that Volumes II and III, Population, Volumes VI and VII, Agriculture, and Volume IX, Manufactures (so far as the material appears elsewhere), as constituted in the Thirteenth Census reports, be omitted from the Fourteenth Census, inasmuch as all the material which would otherwise appear in three volumes of the Fourteenth Census would appear—if Recommendation 37 is adopted—in bound volumes of bulletins. Original data, if any, now appearing in the state sections should be presented in the general reports.

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39. The Committee desires to express gratification at the Director's approval of Recommendation 30, section 3 to 6, advising that the Bureau should at once establish a policy of issuing special studies or monographs upon selected census topics of vital importance to the nation. It is increasingly of the conviction that these special studies are urgently needed to interpret the changes recorded in statistics of this disturbed period. The Committee further recommends that, as suggested by the Director, experts properly qualified to take up this important work under the supervision of Dr. Hill be secured at once. If called upon to do so, the Committee would be glad to cooperate by naming persons qualified to render such expert assistance.

As a tentative and partial list of subjects appropriate for such special studies, the Committee suggests the following titles:

a. Shifting of population since 1910 between sections of the country and between city and country.
b. The growth of cities.
c. The American family.
d. Foreign born population.
e. Native population.
f. School attendance and illiteracy.
g. Child labor.
h. Farm tenure, farm mortgages, and land values.
i. Total and average farm production and farm income.
j. Changes in farm crops and in live stock since 1910.
k. Effect of the war on manufactures and mining.
l. Total production in manufactures per wage earner.
m. Size of manufacturing establishments and form of ownership.
n. Integration and specialization of industry.

APPENDIX II

PERSONNEL OF THE JOINT ADVISORY COMMITTEE

CARROLL W. DOTEN, Professor of Economics, Massachusetts Institute of Technology, Cambridge, Massachusetts. For many years Secretary of the American Statistical Association; actively connected with the Census Bureau during the Thirteenth Census period (1909). At the time of his appointment was a member of the staff of the Central Bureau of Planning and Statistics in Washington.

EDWIN F. GAY, President of the New York Evening Post, Incorporated. Former Dean of the Harvard Graduate School of Business Administration; specialized in Economic history. At the time of his appointment Director of the Division of Planning and Statistics of the Shipping Board, Chairman of the Division of Planning and Statistics of the War Industries Board, Director of the Central Bureau of Planning and Statistics, member of the War Trade Board and other important war-time organizations.

WESLEY C. MITCHELL, Professor New School of Social Research; President of the American Statistical Association, 1917–18; connected with the Census Office 1899–1900. At the time of his appointment engaged in important economic work for the Government related to war activities. 15 Washington Square, New York City.

WILLIAM S. ROSSITER, Chairman, President of The Rumford Press, Concord, New Hampshire. Expert special agent or Chief Clerk of the Census 1900–1909 (during the Twelfth Census and subsequent period). Author of "A Century of Population Growth in the United States, 1790–1900" and papers upon statistical subjects. At the time of appointment was a member of the staff of the Central Bureau of Planning and Statistics in Washington.

EDWIN R. A. SELIGMAN, McVickar Professor of Economics and Finance at Columbia University. Former President American Economic Association. Member of the Commission on Federal Statistical Reorganization, 1908; author of many works on economic and statistical subjects. 324 West 86th Street, New York City.

WALTER F. WILLCOX, Ithaca, New York. Professor of Economics and Statistics, Cornell University. Former President of the American Statistical Association and the American Economic Association; long connected with the Census Office as an official of the Twelfth Census and expert writer; prepared a number of census reports. Consulting Statistician, New York State Department of Health; actively engaged in statistical and census work.

PROCEEDINGS OF THE 81ST ANNUAL MEETING

OF THE

AMERICAN STATISTICAL ASSOCIATION

CHICAGO, ILL., DECEMBER 29–31, 1919

PROGRAM

Monday, December 29.

8 p. m.

Presidential Address:

The Essentials of a Good Census: Joseph A. Hill.

Tuesday, December 30.

10 a. m.

The Improvement of Criminal Statistics in the United States: Louis N. Robinson, Probation Officer of the Municipal Court of Philadelphia.

Discussion by A. J. Todd, Labor Manager, B. Kuppenheimer & Co.

The Bureau of Criminal Records and Identification: Robert H. Gault, Editor of the American Institute of Criminal Law and Criminology.

Fighting Crime in Chicago: Henry Barrett Chamberlin, Operating Director of the Chicago Crime Commission.

2.30 p. m.

Round Table Discussion on the subject of a Continuous Census of Production: Led by M. C. Rorty, Statistician, American Telegraph and Telephone Company.

Discussion by Edmund E. Day, Warren M. Persons and Horace Secrist.

8 p. m.

Business Meeting: Election of Officers, Reports of Committees, etc.

Wednesday, December 31.

10 a. m.

Cost of Production Statistics: Lewis H. Haney, Director of the Bureau of Research and Publicity, Southern Wholesale Grocers' Association.

Discussion by M. C. Rorty, and Wesley C. Mitchell.

Progress in Railway Cost Accounting: Julius H. Parmelee, Statistician, Bureau of Railway Economics.

An International Price Index: Maurice L. Jacobson, Statistician, Federal Reserve Board.

2.30 p. m.

Scope of Statistical Research: John Cummings, Statistician, Federal Board for Vocational Education.

Standardization of Statistical Table Structure: Edmund E. Day, Harvard University.

Statistical Standards in Business Research: Horace Secrist, Northwestern University, Director of the Bureau of Business Research, Chicago.

Methods Employed in the Construction of Infant Rates of Mortality in the United States Life Tables: James W. Glover, University of Michigan.

Minutes of the Annual Business Meeting

Meeting called to order at 9 p. m., December 30, 1919, President Joseph A. Hill presiding.

Minutes of four regular meetings of the Board of Directors, held January 14th, March 28th, May 15th, and October 3d, 1919, were read and approved.

Reports were submitted as follows:

SECRETARY'S REPORT

The following report is submitted in respect to the condition of the Association:

Membership December, 1918			812
Additions during 1919:			
New members	200		
Corporate members	3		
Total		203	
Deductions during 1919		146	
Net gain during 1919			57
Membership December, 1919			869
Besides members we have:			
Subscribers, mostly libraries		242	
Domestic exchanges		40	
Foreign exchanges		71	
Total members, subscribers and exchanges			1,222
Above deductions during 1919 grouped as follows:			
Deaths reported, including four honorary members		20	
Resignations at first of the year		36	
Resignations during year		13	

*Not found	27
Not found since January, 1919	6
Dropped for non-payment of dues, 1914–19	44
Total	146

The death of the following members has been reported during the year:

Honorary members:

Dr. Louis Gillaume, Berne, Switzerland
Andere Nicolai Kiaer, Christiania, Norway
Dr. Egisto Rossi, Ellis Island, New York
Dr. Gustav Sundbärg, Stockholm, Sweden

Regular members:

Hon. J. H. Barton
L. S. Blakey
John J. Brinkerhoff
Reginald L. Brown
William E. Butler
Andrew Carnegie
Edwin W. DeLeon
Victor M. Kime
Benno Loewy
Wm. A. McKenzie
Edward D. Page
Thomas E. Pickett
Carl Schloss
Alonzo W. Shunk
Alexander M. Wilson
John B. Worcester

Four numbers of the PUBLICATIONS have been issued, containing an aggregate of 331 pages. A handbook has been published as a supplement to the December issue, containing the names, addresses, and business connections of members.

Three special meetings of the Association have been held in New York City during the year, in March, June, and December. Attendance 50, 60, and 95 respectively.

A special study of 610 members has been made from the new membership blanks as directed by the board. The remaining 247 members did not fill out the blanks.

A further distribution was made according to whether the members had had formal statistical training, through instruction in courses in some institution, or training through practical experience only. Only 271 out of the total of 610, or about 44 per cent, described such formal training on the blanks. On the other hand, about three-fourths of the total, 450 members, were shown to be graduates of some college or university. The following summaries are presented:

* During the year 1919 an effort was made to clear the rolls of uncertain addresses, etc. A special letter was sent to all members who were delinquent in their dues for some part of 1914 to 1917, as well as 1918 and 1919. The 27 and the 6 designated as "not found" were dropped because their letters were returned unclaimed. The 44 mentioned as "dropped for non-payment of dues" were so designated because they did not reply in any way to the special letter sent to them requesting their coöperation and support. No one was dropped who was delinquent only for 1918 and 1919.

DISTRIBUTION OF 610 MEMBERS OF AMERICAN STATISTICAL ASSOCIATION ACCORDING TO OCCUPATIONAL CONNECTIONS AND ACTIVITY IN STATISTICAL WORK

Connections of members	*Number*	*Active**	*Not active*	*Per cent of total in larger groups*
1. Business:				
(1) Banks	21	10	11	
(2) Insurance	115	102	13	
(3) Manufacturing	52	39	13	
(4) Trade	28	20	8	
(5) Transportation and communication	25	19	6	
(6) Other business	41	28	13	
Total business	282	218	64	46
2. Colleges and Universities	98	62	36	16
3. Government bureaus (not functioning as a business)	138	122	16	23
4. Private social organizations	43	31	12	7
5. Miscellaneous				
(1) Legal	13	2	11	
(2) Medical	11	7	4	
(3) Other	25	7	18	
Total miscellaneous	49	16	33	8
Grand total	610	449	161	100

ANALYSIS OF THE ENTIRE PRESENT MEMBERSHIP NUMBERING 847, EXCLUSIVE OF CORPORATE AND HONORARY,† ACCORDING TO YEAR OF JOINING THE ASSOCIATION, GROUPED BY FIVE-YEAR PERIODS.

Year	*Number*	*Year*	*Number*
1919	200	1899–1903	13
1914–1918	278	1894–1898	23
1909–1913	194	1889–1893	53
1904–1908	56	Unknown	30

* By *active* is meant any work with statistical data such as that done by executives in planning, the chief statistician, research workers, graphic work and clerical work with statistical data. This group constituted about 74 per cent of the total.

† There are 19 honorary and 3 corporate members.

GEOGRAPHIC LOCATION OF THE ENTIRE MEMBERSHIP EXCLUSIVE OF HONORARY AND CORPORATE, BY LARGE CITIES AND BY STATES

By Cities

New York City	245	Baltimore	15	San Francisco	5
Washington	116	Pittsburgh	10	Cincinnati	4
*Boston	38	Detroit	9	Minneapolis	4
Chicago	36	Newark	8	St. Louis	3
Philadelphia	30	Cleveland	5	Milwaukee	2

By States†

Alabama	1	Massachusetts	89	South Carolina	1
California	11	Michigan	13	South Dakota	1
Colorado	3	Minnesota	9	Tennessee	3
Connecticut	27	Missouri	6	Texas	5
Delaware	1	Nebraska	4	Vermont	3
District of Columbia	117	New Hampshire	3	Virginia	5
Georgia	2	New Jersey	28	Washington	3
Illinois	51	New York	285	West Virginia	2
Indiana	6	North Carolina	3	Wisconsin	7
Iowa	6	North Dakota	1	Wyoming	1
Kansas	3	Ohio	21	Hawaii	3
Louisiana	1	Oklahoma	2	Philippines	1
Maine	2	Oregon	1	Canada	14
Maryland	21	Pennsylvania	56	Others	17
		Rhode Island	8		

Respectfully submitted,

ROBERT E. CHADDOCK,
Secretary.

Report of Secretary accepted and ordered printed in the proceedings.

REPORT OF TREASURER FOR 1919

RECEIPTS

Membership dues		$2,709.20
Sales and subscriptions of QUARTERLY		907.93
Memorial Volume:		
Sales to members	$274.60	
Sales through Macmillan Co.	388.74	
Total		663.34
Dividends on B. & A. Stock		151.96
Balance on hand, general fund		183.35
Balance on hand, Memorial Volume funds		39.48
Loan made February 1, 1919, Corn Exchange Bank (To pay old loan from Boston Bank)		1,500.00
		$6,155.26

* Does not include Cambridge.

† Arizona, Arkansas, Florida, Idaho, Kentucky, Mississippi, Montana, Nevada, New Mexico, Utah, have no members.

EXPENDITURES

Printing:		
Printing QUARTERLY PUBLICATIONS:		
September, 1918, balance due	$192.36	
December, 1918	293.95	
March, 1919	385.90	
June, 1919	316.87	
September, 1919	611.28	
Total	$1,800.36	
Printing, balance in full, Memorial Volume	537.75	
Other printing expense, stationery, etc.	293.88	
Total printing expenses		$2,631.99
Postage		304.41
Salaries		843.30
Loan paid in full to New England Trust Co., Boston, Mass., for Memorial Volume		1,500.00
Interest on $1,500 loan during 1919		99.00
Expenses, miscellaneous		117.09
Balance forward		659.47
		$6,155.26

ASSETS

17 shares Boston & Albany R. R. stock, deposited with Corn Exchange Bank as collateral for $1,500.00 loan, for the Memorial Volume.

About 675 copies of the Memorial Volume, valued at approximately $2,200.00.

REPORT ON MEMORIAL VOLUME FUND, 1919

RECEIPTS

Balance received from Boston banks	$ 39.48	
Sold 78 volumes to members at special rate	274.60	
Sales through Macmillan Co.	388.74	
		$702.82

EXPENDITURES

Balance due Rumford Press (in full for volume)	$527.75	
Printing circulars	10.00	
Express charges on volumes to Macmillan	9.96	
Interest on $1,500.00 loan during year	99.00	
Balance forward (Forms part of general balance of Association)	66.11	
		$702.82

PAYABLE

The Association has $1,500.00 loan on account of the Memorial Volume still outstanding.

ASSETS

The Association has about 675 copies of the Memorial Volume which should be valued at approximately $2,200.00.

ROBERT E. CHADDOCK,
Treasurer.

AUDITORS' REPORT

We have audited the accounts of the Treasurer of the American Statistical Association as of the close of business December 9, 1919, and find all disbursements properly accounted for by cancelled checks and vouchers. We have also verified the treasurer's record of receipts and disbursements, as shown by his books, with the cash balance on hand, as shown by the bank statement, and find the same in agreement.

As is customary, we have made no audit of accounts payable and receivable.

M. C. RORTY,
E. W. DARLING,
Auditing Committee.

The reports of the Treasurer and the Auditing Committee were accepted and ordered printed in the proceedings.

REPORTS OF COMMITTEES

Report of the Joint Census Advisory Committee of the American Statistical and American Economic Associations.

This report was accepted and ordered published in the proceedings, and will be found on page 76 of this issue.

REPORT OF THE COMMITTEE ON FEDERAL STATISTICS

W. A. Hathaway, chairman of the committee, presented the following report of progress:

Two resolutions or recommendations were referred to the Committee on Federal Statistics by the Board of Directors of the Association, with instructions to investigate and report. These two matters related to the establishment in Washington of a centralized statistical bureau, or some agency for coördinating the statistical work of the government.

The chairman of the committee forwarded these two resolutions to each member of the committee and asked for an individual expression of opinion on them, with suggestions for a method of procedure for work of the committee looking toward a final report on the two resolutions, and also regarding any other work to be taken up by the committee during the year. Replies were received from each member of the committee. The chairman

also consulted with two members of the committee in person and made some tentative inquiries and investigations in Washington relating to the subject. The results of the foregoing activities may be summarized briefly as follows:

(1) That actual centralization of governmental statistical work, *i. e.*, collection, compilation, and distribution, is probably neither desirable nor feasible.

(2) That better coördination of governmental statistical work is desirable and feasible to the end that duplication of work be minimized and the statistical product of the various governmental bureaus be vitalized and given wider distribution to the consuming public.

(3) Considerable difference of opinion exists as to how coördination can best be accomplished. Unanimity of opinion seems to exist for the establishment of a sort of central statistical clearing house composed of representatives from the different governmental statistical bureaus, various scientific societies and associations, and business and commercial associations, etc. But on the point of whether such a central agency should have only an advisory function or be given plenary powers, there is considerable difference of opinion.

In order to accomplish anything really worth while with regard to these plans, it will be necessary to have concerted action on the part of the various governmental bureaus and other interested agencies; and it even may entail legislative enactments. Conditions in Washington during the past year have not been favorable for undertaking any large or far-reaching program of this kind. It is the opinion of the chairman of this committee (and one in which I believe all the other members of the committee would concur) that the line of procedure which would promise the best results would be for the American Statistical and American Economic Associations to appoint a joint committee on this subject, such committee to organize and invite the active assistance and coöperation of representatives of the governmental statistical bureaus, the United States Chamber of Commerce, and other similar associations. After such organization was perfected, the whole question should be thoroughly studied and surveyed by means of sub-committees with a view to the preparation of a final comprehensive report that should embody the best thought on the subject, point out the evils and deficiencies of the present situation, and recommend remedial action.

That there is need for improvement in the statistical work of the government, no unbiased thinker can truthfully deny. The situation at present is probably worse than in pre-war times, since there are many stray ends of war activity existing. But the situation is not now, and never has been as bad as it has been pictured by various persons at different times; for example, a severe arraignment of the inefficiency and great duplication of governmental statistical work by one of our Congressmen in an article which recently appeared in the *Saturday Evening Post*. Almost all such attacks are unwarranted and are based either upon ignorance of the true situation, or upon the error of judging the whole by a few bad examples.

The report of progress was approved, and the suggestion of the appointment of a joint committee with the American Economic Association was referred to the board with power.

REPORT OF THE COMMITTEE ON BUSINESS STATISTICS

For the committee, M. C. Rorty, chairman, presented the following report:

The Committee on Business Statistics, during the past year, has made a special attempt to determine, through direct contacts with business and industrial concerns and trade associations, the directions in which it might work to best advantage. Very effective support has been secured through the efforts of Mr. Zenas W. Carter, secretary of the Material Handling Machinery Manufacturers' Association who has acted as chairman of a sub-committee on coöperation with trade associations.

The result of these contacts has been to indicate that the committee could do work of greatest immediate value to business and industry by concentrating its efforts on securing adequate monthly statistics of the manufacturing output of a limited number of key industries.

Work along these lines has made rapid progress during the last three or four months, and full coöperation has been secured between the committee and the Census Bureau, the Federal Reserve Board, the Chamber of Commerce of the United States, the National Association of Manufacturers, and the various industries and trade associations concerned.

A detailed statement of the committee's efforts and present program will be submitted in connection with the round-table discussion that is to take place during the present meeting.

Report approved.

REPORT OF THE COMMITTEE ON MEMBERSHIP

The chairman, Willard C. Brinton, presented the report as follows:

The records of the Secretary's office show a considerable increase in the number of paid-up members as compared with the last few years of the Association's history. As soon as a definite policy is established regarding classification of members who are in arrears regarding dues, it would seem desirable to have curves plotted so that the rate of the growth of the society can be accurately judged. Credit for the increase in membership during the year 1919 is chiefly due to the carefully planned work of the Secretary of the Association.

It is the feeling of the chairman of the Membership Committee personally that there are very considerable opportunities for increase in the membership from the various fields of business. Certainly the growth of interest in statistics has been more apparent in the commercial field than in the academic world during the last few years. As the society proves its usefulness, and as the field for statistics expands in the business world, it should

be comparatively easy to increase considerably the membership of the Association.

The final decision of the Board of Directors regarding the policies concerning corporate memberships was made so late in the year that it is not yet possible to determine just how many corporate memberships are likely to be obtained. The corporate members at present are: American Telephone & Telegraph Company; Westinghouse Electric & Manufacturing Co.; General Motors Corporation.

A number of other corporations have the matter under consideration.

It is felt that since the insurance companies depend so largely upon statistics in their regular business, they should be expected to take a considerable number of corporate memberships. It is hoped that some one familiar with insurance work will make an active campaign for obtaining insurance companies as corporate members.

Corporate members are most likely to be obtained through the personal solicitation of some member of our Association known to the corporation approached. It is suggested, therefore, that members of the Association who know officers of any corporation interested in statistical work, should volunteer to approach that corporation on the subject of taking out a corporate membership. The Membership Committee and the Secretary's office will be glad to furnish further information to assist in such a plan.

Report approved.

REPORT OF THE LIBRARY COMMITTEE

Edmund E. Day, chairman, for the Library Committee, made the following report and recommendations:

To understand the present position of the Library Committee of the Association, it is necessary to review briefly the history of the Association's library. Partly as a result of gifts of members and friends, partly as a result of exchanges of the QUARTERLY PUBLICATIONS, the Association had accumulated by 1898 a collection of about 5,000 books and pamphlets. The housing and care of the library was a burden which the Association, in straitened circumstances then as now, bore with increasing difficulty. Finally, in 1898 the Association arranged the transfer of its books to the Boston Public Library. The transfer was in effect an outright gift. Only nominal conditions were attached; namely, that "the purely statistical portion of the library should be kept together, and members of the Association should have free access to the shelves of the collection." Since there is no likelihood of a violation of these simple conditions, the Association has no effective claim upon the books formerly in its collection. With such additions as have been made, they constitute the Statistical Department of the Boston Public Library; they are no longer the library of the Statistical Association.

The Library Committee thus finds itself in an anomalous position. Not only has the Association no library, but there is no way in which the

Association can exercise any control over the books formerly in its possession. The Boston Public Library treats its Statistical Department as it deems best. Naturally, since the public call for statistical material is not as great as for other kinds of library service, the Statistical Department has received less financial support and is more poorly housed than many other departments of the Public Library. Against this situation the Library Committee can bring relatively little pressure to bear. The Library Committee can petition the authorities of the Boston Public Library for better treatment; it cannot bargain effectively for such treatment.

The only library resource of the Association lies in the exchange list of the QUARTERLY PUBLICATIONS. The exchanges of the PUBLICATIONS now go direct to Mr. Horace L. Wheeler, at the Boston Public Library. Mr. Wheeler serves simultaneously as librarian of the Association and as chief of the Statistical Department of the Public Library. Under Mr. Wheeler's supervision the exchanges of the PUBLICATIONS, after being catalogued, pass to the shelves of the Statistical Department. Practically no attempt is made to review the exchanges or to strengthen the exchange list. Thus this one remaining library resource is yielding practically no return to the Association.

If the Library Committee has any future at all, it lies in the exchange list of the PUBLICATIONS. The exchange list should be extended if possible. Important accessions obtained through exchanges of the QUARTERLY PUBLICATIONS should be promptly reviewed. In time, as more cordial relations are established between the Library Committee and the authorities of the Boston Public Library, the library authorities should be brought to see the value of the Association's contribution to the Statistical Department. Then, and not till then, will it be possible for the Library Committee to make a real contribution to the Association's resources.

In the belief that for the present the only work of the Library Committee lies in the exchange list of the QUARTERLY PUBLICATIONS, the committee makes the following recommendations:

1. That the exchanges of the QUARTERLY PUBLICATIONS be placed in charge of the Library Committee.
2. That the exchanges continue to be sent to the chief of the Statistical Department of the Boston Public Library, but be held by him subject to the direction of the chairman of the Library Committee.
3. That the librarian of the Association be also a member of the Library Committee, but not its chairman.
4. That the chairman of the Library Committee coöperate with the Board of Editors of the QUARTERLY PUBLICATIONS to revise and enlarge the exchange list and to secure satisfactory reviews of the most important volumes sent to the QUARTERLY PUBLICATIONS.

The Association approved this report, adopted the four recommendations as stated above, and ordered them to be carried out.

REPORT OF THE NOMINATING COMMITTEE

The report of the Nominating Committee, consisting of Wesley C. Mitchell, chairman, E. A. Goldenweiser and W. S. Rossiter, was presented for final action. The report previously submitted to the members by mail was supplemented by the nomination of William F. Ogburn for Editor. The Secretary was instructed to cast one ballot for the nominations as presented. The following officers were declared elected: President, George E. Roberts; Vice-Presidents, Carroll W. Doten, Lewis Meriam, Horace Secrist; Counsellors, Joseph A. Hill, Warren M. Persons, Walter F. Willcox; Secretary-Treasurer, Robert E. Chaddock; Librarian, Horace L. Wheeler; Editor, William F. Ogburn.

AMENDMENTS OF BY-LAWS

(1) The Association voted unanimously to amend by-law three, which concerns the organization of committees, to read, "The Board of Directors, as soon as practicable after their election, shall appoint two standing committees of three members each, namely, on finance and on the library; and shall appoint from time to time such other committees as in their judgment are deemed necessary for carrying on the activities of the Association."

(2) Further, by-law four was amended by unanimous vote to read, "five associate editors" instead of "four."

(3) The matter of the advisability of charging new members at the time of joining the Association an initiation fee was discussed and was not approved. However, it was voted by the Association, subject to the approval of the next annual meeting, to amend by-law two in such manner as to provide dues of five dollars for regular members and ten dollars for fellows, to become effective January 1, 1921. The discussion showed a desire to prove during the coming year that such a change is justified, by improving our QUARTERLY and extending our activity and membership. Thus, the Association will have a constantly more valuable offering to both old and new members. *Such a resolve the entire membership is called upon to support.*

The Association appropriated $600, as was provided last year, for securing assistance for the office of the Secretary-Treasurer.

The following matters were referred to the board with power:

(1) The Association voted authority to the board and its proper officers to act in the matter of the sale of stock of the B. & A. R. R. to the value of $1,000.00 for payment on the $1,500.00 loan carried for the Memorial Volume Fund, if the board deemed such sale desirable.

(2) The board was authorized to provide, either out of funds on hand or by raising special funds, for more adequate financial support of the PUBLICATIONS and for the expenses of editorial work.

RESOLUTIONS

A Special Committee on Criminal Statistics, appointed by President Hill in response to a resolution at the session on Tuesday morning, December 30th, consisting of Louis N. Robinson, chairman, and John Cummings, offered the following resolutions:

Resolved, That the American Statistical Association urge the Bureau of the Census to appoint at this time an expert in the field of criminal statistics to study the efforts which state and local officials of various states are now making to collect criminal statistics with the view to the development of a plan for the annual collection by the Bureau of the Census of criminal statistics for the United States as a whole.

Resolved, That the President of this Association be asked to appoint a committee to draft a statement to be sent to the Director of the Bureau of the Census setting forth the need for more adequate criminal statistics in the United States, and to work for the improvement and development of criminal statistics in the nation and in the individual states.

The resolutions were approved, and the President appointed Edith Abbott, Horatio M. Pollock, and Louis N. Robinson, chairman, to constitute the committee provided for in the resolutions.

The following resolutions were offered in appreciation of the services of the retiring editor of the PUBLICATIONS:

WHEREAS, the retiring editor, Mr. John Koren, has given a very great amount of time and energy to the arduous task of the preparation and editing of the Memorial Volume, "History of Statistics," as a service to the Association,

WHEREAS, he has edited the PUBLICATIONS for several years with entire devotion to the interests of the Association.

Resolved, that the American Statistical Association express its deep appreciation of the services rendered so faithfully and successfully, and directs that the Secretary publish these resolutions in the proceedings, and transmit a copy to Mr. Koren.

A report was presented by Mr. Allan H. Willett in explanation of the work of the Joint Commission on Reclassification of Salaries in Government Service. In response to his request, the Association voted to request the President, Mr. George E. Roberts, to communicate directly with the Hon. Andrieus A. Jones, chairman of the commission, setting forth the attitude of the Association in reference to the work of the commission.

ROBERT E. CHADDOCK,
Secretary.

REVIEWS

Mortality Statistics of Insured Wage-Earners and their Families: Experience of the Metropolitan Life Insurance Company Industrial Department, 1911 to 1916, in the United States and Canada. By Louis I. Dublin, Ph.D., Statistician; with the Collaboration of Edwin W. Kopf, Assistant Statistician, and George H. Van Buren, Supervisor, Statistical Bureau. New York, Metropolitan Life Insurance Company, 1919. viii, 397 pp.

Under the title given above, Dr. Louis I. Dublin, the statistician of the Metropolitan Life Insurance Company, has made a contribution to vital statistics which is of real national importance. Writing from the point of view of English experience, it surprises one not to be able to obtain year by year from official government returns an accurate and comparative statement of the mortality experience, distributed according to age and sex, and for the chief causes of death, of each chief area and of every city within the national limits. Still more is one struck with the fact that the investigation of the vital question of infant mortality is found to be almost impracticable in most areas, owing to the deficiencies of birth-registration. It is necessary of course, while bemoaning these facts, to recall the vast area of the United States, the immense difficulties in organizing the collection of vital statistics where representatives of many foreign nationalities are concerned, and the further difficulties arising from the virtual independence of each constituent state within the federal government.

But, whatever the reasons which make the accurate compilation and utilization of vital statistics in the greater part of America an aspiration rather than a reality, we have the greater cause for gratitude to Dr. Dublin for having made generally available the experience of the industrial department of the insurance company with which he is associated, for the years 1911 to 1916 inclusive. It is true that this constitutes in some respects a selected population, representing the more frugal section of wage-earners; but when we recall that the experience relates to nearly 54 million years of life exposed during the six-year period under report, it will be seen that it must form an important index of the national life of America, especially since the experience covers nearly every one of the states.

The facts tabulated relate not only to industrial men, but also to the women and children in their families; and separate statistics are given for colored insured persons. The facts are concerned with every age in life, except the first year after birth, which does not come within insurance experience. During the six years under investigation, 636,449 deaths occurred, of which 520,079 were of white persons. Evidently then, there is no fear of inferences being dubious in consequence of the paucity of the data.

As would be anticipated, the death rate at all ages among colored males was nearly 50 per cent higher than that of the white race, the greatest excess being between 15 and 20 years of age. Among colored females the excess of mortality was nearly two-thirds, the greatest excess being in the adolescent period, as for males. As shown in a later section, a large share of this excessive mortality in both sexes is due to tuberculosis, and among women also to conditions associated with child-bearing.

Comparing the insured experience with that of the registration area of the United States for a fairly corresponding period, Dr. Dublin obtained some interesting results. From ages 25 onwards, insured wage-earners show a markedly excessive death rate over that of males in the general population. In view of the partial selective influence of insurance, this is interesting. The excess of accident and sickness in industrial occupations may account for the result; but is it not possible, also, that the apparent death rate among industrial workers has been somewhat raised by a large abandonment of insurance on the part of the more favorable lives?

It is interesting to note that, in order to increase the value of its returns, the Metropolitan Life Insurance Company has adopted an extensive system of correspondence with the certifying physicians. A similar practice has been pursued for many years by the English registrar-general, and has undoubtedly done much to secure increased accuracy for doubtful certificates, and to stimulate more accurate future returns.

The chapter on tuberculosis comprises valuable material. It shows, for instance, the terrible excess of tuberculosis among the colored population, a fact which the white population cannot afford to ignore, and which calls for steady, continuous, remedial measures on their part. Here, again, it is a striking fact that among the insured the death rate from pulmonary tuberculosis was 31 per cent higher than in the general population. This does not point to any elimination by primary medical examination. It may mean merely excessive disease in wage-earners; possibly also, a disproportionate resort of weakly persons to insurance.

There follow chapters on cardiac diseases, pneumonia, various forms of accidental injury, suicide, and homicide, containing much interesting matter, but not calling for special comment.

Cancer mortality was higher among white than among colored persons, colored males showing relatively more favorable rates than colored females. As bearing on the possible influence of improved registration in showing statistical increase of cancer mortality, it is interesting to note that among white males between 1911 and 1916 the death rate per 100,000 increased from 68.0 to 70.3, among colored males from 28.9 to 36.5.

No note appears to be needed as to the chapters dealing with cerebral hemorrhage and apoplexy, communicable disease of childhood, and diarrhoea and enteritis.

The chapter on "Diseases and Conditions Incidental to the Maternal State" deserves careful study, especially by those engaged in public health work. It deals with 10,056 deaths occurring among women aged 15 to 45 years, equal to a death rate of 68.4 per 100,000 women, or 66.1 and 82.3 for

white and colored women respectively. It is little short of a statistical calamity that these rates cannot be stated in *terms of the population at risk* from these special causes of death, *i. e.*, of the number of women who have borne children during the period, or of the number of births; and that similarly in most American centers of population, it is equally impossible to state by an accurate method, the risks of child-bearing, or to compare one area with another in this respect, or the same area with itself in a series of consecutive years. Subject to this serious limitation, which Dr. Dublin properly laments, there is much that is instructive in this chapter of his book; and the statement that at child-bearing ages, puerperal conditions in their entirety represent a hazard to the life of women, which is second only to that from pulmonary tuberculosis at these ages, is an urgent call to the adoption of the well-known preventive and remedial measures which would bring child-bearing more nearly to its proper position as a normal physiological event, and not a condition involving risks which are far from negligible.

In the preceding notes a few points have been brought out in relief, which have particular public health importance. The list has not been exhausted. In the absence of national returns of mortality on a similar plan, every chapter of the book can be utilized by public health officials for comparing their local mortality experience with the experience of a large section of the total population of the United States. And apart from this sphere of utility, physicians interested in any particular class of disease will find here valuable data for comparison with the results of their own experience. The subject of each chapter is carefully and soberly set forth, the limitations of the data are adequately stated, and the reviewer has failed to find throughout the volume a single statement which is not amply substantiated by the valuable statistics accompanying it.

ARTHUR NEWSHOLME.

How to Make and Use Graphic Charts. By Allan C. Haskell, with introduction by Richard T. Dana. New York, The Codex Book Co., 1919. 539 pp.

The purpose of this book as stated by the author is twofold: "(1) By giving many illustrations, to suggest to those already familiar with the functions of graphic charts new ideas for the uses of the various rulings, and (2) to show those who have never used charts at all, or but little, the principles of their use and to explain as simply as possible the many advantages to be derived by becoming familiar with this method of presenting facts."

In carrying out this purpose the author devotes the first 50 pages to the theory and construction of the various types of charts, and the following section of about 25 pages to the discussion of the general principles underlying the use of charts. The main body of the book is divided into chapters according to the branch or activity of business in which charts are used. That is to say, the material has not been grouped by types of charts but

rather by subjects which charts illustrate. Because of this arrangement the book will appeal to the reader as a new approach to the study of graphic methods.

The first four chapters of the main part of the book have to do mainly with business control. Their titles are, "Organization and Management Charts," "Cost and Cost Analysis Charts," "Scheduling and Progress Charts," "Operating Characteristics." In the next section of two chapters are found special uses of charts, under the headings: "Charts Showing the Results of Tests and Experiments," "Trends, Tendencies and Statistical Prediction Shown by Charts." The two succeeding chapters, one on computing charts and the other on the use of charts in designing and estimating, cover about 150 pages, and should be especially valuable to engineers and students. The final chapter describes miscellaneous uses of charts.

The book for the most part is a compilation of articles that have appeared in business and trade publications. A few have been taken from special reports. Even though the reader may have followed these same publications pretty closely during the past few years he will be struck by the wide range of the use of graphic methods as exhibited by the contents of this book. Most of the several hundred articles bear dates within the past two or three years. One comes from the year 1893, but few of them are older than 1917. More than forty publications are represented in the list of sources, and the text is profusely illustrated by charts and diagrams.

A compilation such as this is will be welcomed because the selection of the material has been made with a definite purpose in view, and because it preserves in permanent and convenient form many articles which the reader has previously read with interest and profit, and will want to read again. In many cases, parts of the articles not dealing with charts have been omitted without loss. At the end of each chapter is a bibliography of other articles dealing with subjects related to those treated in the chapter.

The individual articles are distinguished by indented, bold faced headings, which in two or three words tell what the article is about. The name of the author of the article, the publication in which it originally appeared, the date, and frequently the full title of the article follow the heading. These same headings are gathered together in an alphabetical index at the end of the book. It is therefore possible for the reader to find the topic in which he is interested either by looking for the heading under the chapter captions, or by going directly to the index. There is also an analytical table of contents.

The book is primarily useful to engineers, but it should also be valuable as a reference and source book to all who have occasion to employ graphic methods. The chapters on logarithmic and semi-logarithmic charts will be particularly welcome. To bring together in the same volume a wealth of material pertaining to both the so-called statistical chart and to the engineer's computing chart should mark an advance in graphic methods.

There are a number of typographical errors, and a better quality of paper would have improved the appearance of the charts in a several

cases, but considering the vast amount of technical detail covered and the condition of the paper market both of these defects may be excused.

ARTHUR R. BURNET.

Applied Eugenics. By Popenoe, Paul, and Johnson, Roswell Hill. New York, Macmillan Co., 1918. 459 pp.

This book presents an excellent summary of the need for eugenics together with the evidence regarding eugenic problems, and outlines forcefully a rational eugenic program. For the most part, the conclusions will command ready assent. The argument for race improvement, wherever race improvement can be attained by eugenic methods, is of course unanswerable. The program set forth is moderate; the restrictive measures recommended are limited to cases in which evidence is conclusive, and the positive measures are mostly educational and are aimed to promote marriage among the fittest of the population.

An impressive array of evidence is presented to show the preponderating effect of heredity over environment. One doubts the wisdom of this emphasis on a controversial question which, in the light of a forward looking program, probably was never worth debating. It is a question not of alternatives, but of complementary programs. For persons now in the world, no change of heredity is possible; so far as they are concerned, progress is dependent upon environment. For future generations, race improvement is undoubtedly a factor in progress, and of course all possible improvement in the stock should be sought; for such improvement the evidence is almost wholly in favor of heredity. Except for a relatively small field where environmental changes produce dysgenic effects, the general question as to the relative values, so far as progress is concerned, of heredity and environment, is scarcely pertinent, since problems have to be solved not by generalities, but by the facts relating to the specific case.

In regard to one such case, exception may be taken to the conclusion reached by the two authors. It is argued that infant welfare work has a dysgenic effect in that the saving of weaker infants results in the deterioration of the race. But the evidence does not warrant such a conclusion. For the reduction of the infant mortality rate has not led to an increase in mortality at ages over one year, as the theory advanced would require, but on the contrary, has been accompanied by a reduction in mortality at practically all ages. The argument is very similar to that made in reference to vaccination and smallpox in the early nineteenth century. It was then argued that vaccination was of little use, since children—"with weak constitutions"—saved from smallpox would die anyway in a few years from some other disease; but experience has showed that the reduction in mortality from smallpox did not cause an increase in mortality from other causes. Nor should it be overlooked that the decrease in morbidity, which is usually associated with a reduction in mortality, is often an important factor in reducing mortality at later ages, since many of the diseases of childhood have serious after effects and leave those who survive with weakened constitutions.

The argument under examination assumes that the fact that a child dies may be accepted as evidence that its heredity—not merely its constitution, for its constitution may be weakened by environmental causes—is faulty; but this assumption must first be proved. A death in an automobile accident is evidently not causally related to faulty heredity; and in general, faulty heredity cannot be assumed to be proved until all direct environmental causes of death or weakness have been eliminated. But the majority of infant deaths are caused by these environmental factors. In particular deaths from gastric and intestinal diseases, the most important single group of causes of death under one year, are due almost wholly to improper feeding and to infection. The effect of such improper feeding is seen not only in the mortality of infants, but also in the impaired or rachitic constitutions of young children. It is surely difficult to see how prevalence of ignorance or carelessness in feeding infants could result in improving the constitutions of the human race. Furthermore an infant's weakened condition is frequently a result of poor obstetrics or of inadequate prenatal care of the mother, and in this case also the removal of the cause should logically remove the result. The elimination of the causes of weakened infants' constitutions, the substitution of proper for improper methods of feeding, and the prevention of exposure to infection should logically result, therefore, in the improvement of the health and vigor of the race.

It is true that the authors of the book under review do not advocate the abandonment of infant welfare work; they prefer to believe that its dysgenic effects are offset by the cultivation of the feelings of sympathy and love for the weak. But the conclusion that infant welfare work has dysgenic effects seems to have been accepted without a sufficient weighing of the evidence.

In spite of these minor criticisms, the book can be recommended as a readable and well-rounded presentation of the subject, and it meets the need for a comprehensive treatment of the eugenic program.

ROBERT M. WOODBURY.

Commercial Research. By C. S. Duncan. New York, The Macmillan Co., 1919. 385 pp.

The subtitle of this book states that it is an outline of working principles. This brief characterization is well founded, as a reading of the book will show. It is neither a book of forms and illustrations nor an abstract discussion, but a practical and logical investigation of the need of business information, the methods of securing it, and the uses to which it can be put. Business men and students of business will find this book full of suggestions that are immediately serviceable.

The purpose of the book is well expressed in the preface by a series of five propositions. As the author has followed these propositions closely a repetition of them here will show what he intended to convey:

1. The immediate and primary need of business today is intelligent direction and control, individually, generally.

2. Intelligent direction and control of business can be had only by a better knowledge of business principles.

3. A better knowledge of business principles can be derived only from a careful and comprehensive survey of business facts.

4. To secure a careful and comprehensive survey of business facts is a problem for business research.

5. Therefore, the immediate and primary need of business today can be met only by business research.

This volume appears at a very opportune time because of the deep effect of the war on American business life, and because of the pressing problems of peace just now facing us. The general reader in the field of economics and business will meet in the pages of this book many thoughts and ideas that he has previously seen in print during and since the war, or that have come to his own mind when he considered the trend of affairs. But to find these same ideas so well expressed and their application so clearly and freshly pointed out in a single volume will bring great satisfaction. The statistician will discover in new form and application many of the things familiar to him from acquaintance with his text-books. In fact, this volume furnishes justification for the use of the statistical method in business. Considerable space is taken up with a constructive criticism of graphic methods.

Though not written as a text-book, it embodies several of the good features of such a book, as for example, topical synopses, at the beginning of each chapter, and indented and italicized headings at the beginning of important paragraph groups. The conclusions at the end of each chapter are not merely summaries of what has gone before, but are succinct statements of the point to which the argument has been brought.

The following summary will give the reader of this review a rough idea of the way in which the theme of the book has been developed:

In the introductory chapter covering 25 pages, the author shows how changing world conditions have brought about a new era involving complicated relationships, into which we can safely enter only with a greater knowledge of the facts. Many of the old calculations are invalid. There must be evolved new working principles based upon new analyses. It is, therefore, proposed to carry into the field of commercial organization the same attitude of scientific research that has already been applied with great effectiveness in the field of production.

The kind of research will necessarily be determined by the nature of the goods handled, and the class of business, whether wholesale or retail. The sources of business facts are either the internal records of the company or external records from governmental, trade, or other sources which are described in detail. A survey of the character of business data shows what kind of information can be secured from such sources. The business man will want to know whether the data are precise or estimated. He must also know how numerical information is affected by the classes of commodities to which it is applied, and how much faith to place in statements of market conditions, and in studies of population and wealth distribution, wages, prices, incomes, etc.

The method of collecting such internal and external statistics is given careful consideration. Statistics should be intelligently collected, and made ready for instant use. The author has a good deal to say about the proper control of data, and about the file card, letter of inquiry and questionnaire methods of securing and preserving information.

Under the heading: "Analysis of Business Facts," the author describes the statistical method, and shows why and how this method should be used by the business man. "No manufacturer or merchant," he says, "can meet his administrative problems fully without the use of applied statistics." A good deal of attention should be given to the determination of units of measurement, and to the source and elimination of errors. The author cites authorities on the various kinds of averages, and presents examples of each kind.

Great care should be used in the presentation of information, since business facts do not always speak for themselves. The use of graphic methods is commended, but observance of rules and cautions is emphasized.

Of even greater importance is the interpretation of business facts. "It means the translating of many facts of varied character and value into a plan of action, into a business policy." In this chapter the author gives a list of fifteen checks or test questions by which the interpretation of business facts is to be judged.

Another chapter deals with the various forms of organization for research. An individual may carry on the work in connection with his regular duties, or a separate department may be established. Assistance can be secured from trade associations, advertising agencies, progressive auditing concerns, and from companies especially organized to handle commercial research.

After it has been decided to go into research work, there are certain principles and rules to be observed which the author describes under three heads: the commodity, the market, and the trade organization whose function it is to get the commodity to the market. These are called the three fundamental elements of business analysis.

The closing chapter of the book, entitled "The New Business," is a splendid résumé of the factors affecting present-day commercial activity. It contains a vivid description of the sudden stimulation of business by the demands of the war, and of the effect of governmental control, price fixing, examination of the costs of production, limitation of profits. The author points out what he considers to be the persistent elements of business, and he also visualizes for us the spirit of the future.

ARTHUR R. BURNET.

First Annual Report of the Dominion Statistician, Fiscal Year ended March 31, 1919. Dominion Bureau of Statistics, Canada. 51 pp.

The problems of the organization of public statistics in Canada are in their broad outlines no different from those in this country. The restricted scope of government statistics, their planless origin and development,

duplication in the work of statistical agencies, and varying standards of reliability, constitute a few of the problems in statistical organization which the Canadian government undertook to study and to solve. The first step was taken in 1912 with the appointment of the Statistical Commission. The function of this commission was to make a comprehensive survey of public statistical work in Canada and to formulate plans for improved organization. The outcome of the commission's investigation was the recommendation that there be established a central statistical office for the purpose of coördinating the statistical work of existing agencies. As a result of this recommendation, the office of "Dominion Statistician" was created on June 19, 1915. The incumbent of this office was charged with the direction of the statistical activities indicated in the report of the Statistical Commission. The latest phase in the application of the report of the Statistical Commission developed with the passage in 1918 of the "Statistics Act." This act sets forth the general principles of a centralized and coördinated statistical organization. It creates also the Dominion Bureau of Statistics which is primarily charged with the general administration of the act. More specifically, the duties of the bureau are "to collect, abstract, compile and publish statistical information relative to the commercial, industrial, social, economic, and general activities and condition of the people"; to collaborate with all other departments of the government "in the compilation and publication of statistical records of administration"; and to take the census.

The first report of the dominion statistician describes the organization of the Dominion Bureau of Statistics, its activities during its first year of life, and its plans for the future. Formally, the organization of the bureau is simple. Depending upon the subject matter, statistical studies are made by one of the following ten divisions of the bureau—population, agriculture, industry, foreign trade, transportation and communication, internal trade, finance, administration of justice, education, general. The last named division prepares the *Canada Year Book* and has now under consideration plans for a quarterly or monthly journal containing statistical material of general interest. The work of all the divisions is coördinated through the Division of Administration. The operation of the bureau cannot, however, be understood from a knowledge of its formal organization alone. Statistical material in Canada as in the United States is largely collected by administrative agencies in the exercise of their administrative functions, or by statistical bureaus that are only appendages of the administrative agencies. The first and most important task of any central statistical bureau consists in influencing the character of the statistical output of the administrative departments.

By an order in Council passed October 12, 1918, the nature of interdepartmental relations was outlined. All purely statistical investigations are entrusted to the bureau; the dominion statistician is empowered to recommend to administrative departments a proper procedure for the collection and compilation of their statistical records; all statistical compilations shall be made when practicable on machines installed in the bureau. The

practical effect of these provisions on the work of the bureau is illustrated in the proposed annual census of industry. This census will be taken by a distinct organization which will collaborate with those departments that have executive functions in specific sections of the field. "The desideratum in such collaboration is to place the industrial technic of the administrative departments at the service of the census, and the general statistical point of view of the census at the service of the departments. Many of the latter have considerable field staffs in close touch with the industries. . . . These form the ideal substitute for the untrained enumerators of the population census" and are best equipped to collect and examine the statistics in the field. The bureau performs the function of "bringing the departments into council, planning the inquiry as a whole, . . . and generally defining methods."

The activities of the bureau are not restricted to its coördinating functions. Plans for elaborate statistical investigations into fields hitherto untouched are also under way. The most striking of these is concerned with the development of the statistics of internal trade. The bureau proposes in this case to supplement the statistics of foreign trade with data showing the movement within the country of the more important goods. Provision is also made for a large extension in the field of price statistics. To avoid duplication, the wholesale price records of the Labor Department will be merged in the bureau. Statistics will then be collected on producers' prices, wholesale and jobbers' prices, import and export valuations, the prices of securities, and retail prices. In collaboration with the Department of Labor, the bureau will undertake the construction of an index number of wages.

Students of the organization of public statistics in the United States will follow the development of the Dominion Bureau of Statistics with great interest. The existence in this country of similar problems makes the success of the Canadian experiment a matter of immediate concern to American statisticians.

LEO WOLMAN.

NOTES

EDITORIAL NOTE

With this issue a new editorial board takes charge of the QUARTERLY PUBLICATIONS OF THE AMERICAN STATISTICAL ASSOCIATION. The new staff hopes that the QUARTERLY will be of continually greater service to the readers and an increasingly important medium for statistical research.

To make the work more effective the broad field of statistics has been sub-divided, and each member of the board has assumed responsibility for a particular section. With this arrangement, the editors will be able to keep in touch with the various problems and with the statistical work in progress in the respective fields. Statisticians conducting researches in the various fields are invited to use the QUARTERLY as a means of publication.

The department of notes and reviews will receive especial attention. It will present news items concerning statisticians and their activities, comments on statistical organizations both in this and in other countries, and notes on current publications as well as reviews of significant books and reports. Dr. Leo Wolman has consented to take charge of this section. Coöperation not only on the part of the editors, but also on the part of the association membership will be of great aid in making this department of value. Members are urged to send to the editor's office any notes which they think of interest.

Through these plans the editors hope to make the QUARTERLY PUBLICATIONS OF THE AMERICAN STATISTICAL ASSOCIATION a journal of increasing influence in the development of statistics.

THE EDITORS.

A NEW STATISTICAL JOURNAL

The readers of the QUARTERLY will be interested to learn that a new international review of statistics is about to be issued. This will be known as *Metron* and will be under the editorial direction of Professor Corrado Gini of the University of Padua. Professor Gini will have associated with him the following editorial board:

Prof. Raymond Pearl, Professor of Vital Statistics, Johns Hopkins University.
Prof. L. March, Director of Statistics of France.
Dr. M. Greenwood, Lister Institute, University of London.
Prof. L. V. Furlan of the University of Bale, Switzerland.
Dr. F. P. Cantelli, Actuary to the Exchequer of Italy.
Prof. A. Andreadis of the University of Athens, Greece.
Dr. G. H. Knibbs, Director of the General Statistics of the Commonwealth of Australia.

The scope of this journal is not as yet entirely settled, but it is possible at this time to say that it will give a place to original articles and to reviews of the more important statistical work in the several countries. Sections of the journal will be given over to statistics as a method and as related to particular sciences, such as demography, anthropometry, economics. In addition there will be a catalogue of publications received, as well as a review of the better statistical sources. Italian, French, English, and German are the official languages of the journal. The first number of *Metron* will appear early in 1920, and we shall watch the progress of this promising publication with great interest.

American statisticians who may desire to coöperate with the directors of this journal should send their manuscripts either to Professor Pearl at Johns Hopkins or to Professor Gini at the University of Padua, Italy. Subscriptions are to be sent to the *Tipografia Industrie grafiche italiane Padova, Via Viscovado.*

L. I. D.

STATISTICS OF COAL PRODUCTION

Since the summer of 1917 the operations of the coal and coke industry in the United States have been illuminated by the publication, through the joint effort of the U. S. Fuel Administration and the U. S. Geological Survey, of statistical reports on the production and distribution of coal and coke. A few months after the entry of this country into the war, Mr. C. E. Lesher of the *Geological Survey* prepared weekly reports on the production of bituminous and anthracite coal and of beehive coke, and on the factors responsible for variations in output. This weekly statement is still being issued by the *Geological Survey;* at present under the direction of Mr. Fred G. Tryon. In September, 1919, a survey of the production of coal in 1917, prepared by Mr. Lesher, was published by the *Geological Survey.* The latest and one of the most interesting of this series of reports on the coal industry is *The Report of the Engineers Committee of the U. S. Fuel Administration, 1918–1919.* The findings of the committee were designed to serve as the basis of a scientific system of price control in the coal industry. The text of the report is devoted to a discussion of alternative theories of price regulation, and to the mode of collection and the meaning of cost data. To supplement the text, a most valuable set of charts, showing the distribution of costs in the various coal fields in the United States is appended. With the appearance of the report of the U. S. Fuel Administration and of Mr. Lesher's second volume on the distribution of coal in 1917, the facts essential to a proper understanding of the conduct of the coal industry during the war will be available.

L. W.

FOOD REQUIREMENTS AND FOOD EXPENDITURES OF MEN AND WOMEN

The desirability of apportioning food expenditure between husband and wife has occasionally arisen in connection with family budgetary studies.* The selection of the best ratio presents many difficulties.†

It would seem desirable, if possible, to establish the ratio on purely physiological grounds. The actual food requirements of men and women should serve as a basis for the establishment of the ratio. We may, therefore, direct attention to the constants recently based‡ upon precise measurements of the basal metabolism of 136 men and 103 women.

For purposes of practical rationing, the basal metabolism constant of the individual must be multiplied by the proper factor for the increase in metabolism due to activity. In the absence of information concerning this factor, which will vary according to the occupation and habits of the subject, the safest basis of comparison seems to be the basal metabolism constant.

In the volume cited it has been shown that the daily basal heat production of the average man is 1,632 calories, whereas that of the average woman is 1,349. Thus the daily heat production of woman is about 300 calories less than that of man. Expressing the relationship as a ratio we have 100 : 83.

This value makes no allowance for muscular activity. Neither does it take into account differences in the age§ of the subjects dealt with, nor differences in their size. Women are, on the average, smaller than men. In either sex, large individuals have on the average a greater food requirement than smaller ones. From the budgetary standpoint, body size is not to be taken into account. It is, however, interesting to note that the average daily basal heat production of the 136 men was 25.7 calories per kilogram of body weight, whereas that of the 103 women was 24.5 calories per kilogram; or, the two stand in the ratio of 100 : 95. On the basis of the older conventional physiological standard of estimated body surface

* *Ann. Rept. U. S. Comm. Labor*, vol. xviii, p. 102, 1903; *Monthly Labor Rev., U. S. Bu. Labor Stat.*, Oct., 1917, p. 6, Dec., 1917, p. 6, and Dec., 1918, p. 115.

† The direct determination of the food consumption of the two on the basis of family statistics is practically impossible. Secrist (*Am. Stat. Assn. Publications*, vol. xvi, pp. 467–471, Sept., 1919) has suggested the use of cafeteria checks. As a basis for estimating the food item of annual budgets of men and women under given economic conditions, his statistics have some interest. They do not, however, seem to be of much value for purposes of determining the proper apportionment in family budgets, for the following reasons: The class of individuals is not the same. In one case expenditure is altogether individual; in the other a joint food supply is purchased. We note in short that food *expenditures* measured in this way would not necessarily represent the food *requirements* of the individual. While cost is the measure required in family budgetary studies, the division of actual cost of the joint food supply of husband and wife is more likely to represent actual food requirements of the two sexes than is the expenditures of the college, office, shopping, and theater classes in public restaurants.

‡ Harris, J. Arthur, and Benedict, Francis G., "A Biometric Study of Basal Metabolism in Man." Publication 279, Carnegie Inst. of Wash., 1919.

§ Metabolism decreases with age (Harris and Benedict, *loc. cit.*, pp. 107–127). The mean age of the 136 men is 26.88 years, whereas that of the women is 31.15 years. Since age cannot be considered in most budgetary studies this factor must be neglected.

area (Meeh), men show a food requirement per square meter of 830 calories as compared with 753 calories for women, or a ratio of 100 : 94. On the basis of the revised surface standard (Du Bois) the ratios are 925 : 850, or 100 : 92.

When body weight, stature, and age (all of which have been shown to be significant factors in determining, in the statistical sense, the metabolism of the individual) are taken into account by the use of multiple prediction equations,* women show a basal metabolism rate about 6.2 per cent lower than that of man.

These values, in which correction for body size and age have been made, are inserted merely to emphasize the reality of the difference in the basal metabolism of men and women. For purposes of actual rationing, differences in size must not be disregarded. It appears, therefore, that the 100 : 90 which has been used in the past is not an unfair ratio. Probably 100 : 85, in view of the generally greater muscular activity of the man, or an even lower ratio, would more properly express the proportion assignable to husband and wife.

J. Arthur Harris.

FOOD PRICES IN THE UNITED STATES DURING THE WAR

Although the various indices are in substantial agreement as to the course of food prices in the United States during the period of the World War, confirmation of the record by data drawn from independent sources is still desirable. Such confirmation is at hand in the accounts of a large concern† which makes a business of operating restaurants in different parts of the country. The company purchases its supplies chiefly in Chicago, Kansas City, St. Louis, San Francisco, and Los Angeles. The supplies are largely foodstuffs of better grade. The purchasing records of the company thus reflect the ruling wholesale food prices in the principal western markets.

The table submitted below develops a weighted index of wholesale food prices in April, 1919, as compared with April, 1916. Columns (2) and (3) of the table give the prices paid in April, 1916, and April, 1919, for unit quantities (column 1) of 67 articles. The unit price in each case is an average derived from the company's purchases of the month. Column (4) states the number of units of the article used during April, 1919, at one of the company's restaurants. This restaurant is in a "railroad town" and caters chiefly to passengers from trains and to railroad shop and trainmen. Column (6) lists the amounts actually paid for the goods used at the restaurant during April, 1919. Column (5) shows what would have been paid for the same quantities of the same articles had they been purchased at the prices of April, 1916. The ratio of column (6) to column (5) indicates that wholesale prices of the foods on the list, weighted in the manner indicated, rose approximately 74 per cent during the three years ending April, 1919.

*Harris and Benedict, *loc. cit.*, p. 205–219.

† The company has requested that its identity be not disclosed.

WHOLESALE PRICES OF THE PRINCIPAL PERISHABLE AND GROCERY SUPPLIES USED AT A RESTAURANT IN A "RAILROAD TOWN," APRIL, 1916, AND APRIL, 1919

Article	Unit	Price per unit		Amount used April, 1919	Amount used April, 1919, X price April, 1916	Amount used April, 1919, X price April, 1919
		April, 1916	April, 1919			
	(1)	(2)	(3)	(4)	(5)	(6)
		Dollars	*Dollars*	*Unit*	*Dollars*	*Dollars*
Grains and their products:						
Corn meal	Lb.	.02	.045	92	1.84	4.14
Crackers, oyster	"	.07	.16	74	5.18	11.84
Flour, hard white	Cwt.	2.70	5.00	46	124.20	230.00
Flour, soft white	"	2.82	4.95	26	73.32	128.70
Macaroni	Lb.	.05	.105	42	2.10	4.41
Oatmeal	Pkg.	.15	.255	46	6.90	11.73
Rice	Cwt.	5.45	10.50	1.05	5.72	11.02
Spaghetti	Lb.	.05	.105	68	3.40	7.14
Wafers	Pkg.	.114	.18	102	11.63	18.36
Sugar and related products:						
Sugar, granulated	Cwt.	5.66	9.00	19.9	112.63	179.10
Sugar, powdered	"	5.70	10.00	2.88	16.42	28.80
Sugar, N. C.	"	5.48	9.55	4.01	21.97	38.30
Sugar, C. L.	"	7.00	10.33	5.74	40.18	59.29
Syrup, Mayflower	Gal.	.73	1.30	32	23.36	41.60
Vegetables and truck:						
Fresh—						
Asparagus	Lb.	.08	.14	260	20.80	36.40
Beans, lima	"	.06	.134	73	4.38	9.78
Beans, navy	"	.055	.09	165	9.08	14.85
Beets	Doz. bchs.	.33	.34	18	5.94	6.12
Carrots	" "	.385	.42	27	10.40	11.34
Cauliflower	Doz.	.90	1.16	12	10.80	13.92
Lettuce	"	.26	.465	133	34.58	61.84
Onions, old	Sack	1.66	3.68	7	11.62	25.76
Potatoes	"	1.94	2.57	62	120.28	159.34
Turnips	Doz. bchs.	.36	.29	21	7.56	6.09
Canned—						
Beans, string	3 lb. can	.10	.18	145	14.50	26.10
Corn	" " "	.086	.18	128	11.01	23.04
Peas, Early June	" " "	.092	.18	95	8.74	17.10
Fruits:						
Fresh—						
Apples, cooking	Box	1.24	2.08	29	35.96	60.32
Apples, table	"	1.94	3.67	15	29.10	55.05
Bananas	Lb.	.045	.077	509	22.90	39.19
Grapefruit	Box	2.80	2.63	17	47.60	44.71
Oranges	"	1.54	4.20	13	20.02	54.60
Strawberries	"	.07	.14	165	11.55	23.10
Canned—						
Apricots	Gal.	.27	.46	19	5.13	8.74
Blackberries	"	.314	.63	12	3.77	7.56
Peaches, pie	"	.27	.583	29	7.83	16.91
Pineapples	3 lb. can	.115	.21	104	11.96	21.84
Dried—						
Prunes	Lb.	.058	.17	75	4.35	12.75
Raisins	"	.107	.107	278	29.75	29.75
Poultry and dairy products:						
Butter, table	"	.315	.62	882	277.83	546.84
Cheese, American	"	.175	.26	106	18.55	27.56
Cream	Gal.	1.00	1.50	343	343.00	514.50
Eggs	Doz.	.218	.415	1749	381.28	725.84
Chickens	Lb.	.235	.44	620	145.70	272.80
Hens	"	.18	.36	499	89.82	179.64
Milk	Gal.	.20	.32	1847	369.40	591.04
Fish:						
Fish	Lb.	.06	.11	581	34.86	63.91

Article	Unit	Price per unit		Amount used April, 1919	Amount used April, 1919, X price April, 1916	Amount used April, 1919, X price April, 1919
		April, 1916	April, 1919			
	(1)	(2)	(3)	(4)	(5)	(6)
		Dollars	*Dollars*	*Unit*	*Dollars*	*Dollars*
Meats and fats:						
Bacon	Lb.	.22	.485	249	54.78	120.76
Beef butts	"	.14	.22	1847	258.58	406.34
Beef loins	"	.22	.44	484	106.48	212.96
Beef short ribs	"	.08	.15	259	20.72	38.85
Calf liver	Each	.20	.30	50	10.00	15.00
Frankfurters	Lb.	.12	.23	70	8.40	16.10
Ham	"	.17	.30	2092	355.64	627.60
Lamb racks	"	.18	.48	183	32.94	87.84
Lard	"	.11	.24	1188	130.68	285.12
Mutton legs	"	.09	.30	97	8.73	29.10
Pork loins	"	.155	.293	229	35.50	67.10
Sweetbreads	"	.16	.18	380	60.80	68.40
Veal hinds	Cwt.	13.46	28.00	3.33	44.82	93.24
Miscellaneous:						
Baking powder	Lb.	.22	.33	100	22.00	33.00
Catsup	Gal.	.65	.95	15	9.75	14.25
Coffee	Lb.	.265	.31	432	114.48	133.92
Oil, olive	Gal.	2.165	4.62	11	23.82	50.82
Salt, rock	Sack	.325	.65	28	9.10	18.20
Soap, laundry	Box	2.00	4.66	13	26.00	60.58
Vinegar	Gal.	.14	.31	34	4.76	10.54
Total					3,946.88	6,872.48

Ratio of total outlay in April, 1919 ($6,872.48), to total outlay in April, 1916 ($3,946.88) = 174.1 per cent.

Similar data have been prepared by the company for the periods shown in the following table:

Period	*Increase in prices*
June, 1914, to June, 1919	72.3 per cent
April, 1917, to April, 1919	39.5 " "
June, 1918, to June, 1919	16.7 " "

A comparison of these figures with the index for the period April, 1916, to April, 1919, would indicate that food prices did not rise from the middle of 1914 to the middle of 1916. From April, 1916, to April, 1917—the last year of our neutrality—prices increased much more rapidly than from April, 1917, to April, 1919—the two years following our entrance into the war.

EDMUND E. DAY.

TRANSFER OF THE REGISTRAR-GENERAL'S OFFICE

The whole administration of the Department of the Registrar-General of Births, Deaths, and Marriages, including the administration of the census of the population, has been transferred to the Ministry of Health. In April, 1918, the British Medical Association issued a pamphlet on the Ministry of Health, giving reasons for its establishment as one of the principal departments of state, and recommending this change. In this pam-

phlet it was pointed out that one of the main duties of a Ministry of Health would be the prosecution of scientific research by the analysis of statistics, among other means, and it was observed that the registrar-general's department could easily be transferred directly to the Ministry of Health.

At that time the registrar-general reported to the president of the Local Government Board, through which board responsibility to Parliament was maintained; but the registrar-general's office was practically an independent government department. The British Medical Association also stated that the information which the registrar-general's department was able to supply was essential to efficient health administration, both central and local, and suggested that the department, on its transfer to the Ministry of Health, should take over the preparation of certain statistics such as those furnished under the Act for the Notification of Infectious Diseases.

Dr. Addison has appointed Mr. S. P. Vivian, an assistant secretary in the Ministry of Health, to be Deputy Registrar-General of Births, Deaths, and Marriages.

L. I. D.

A CORRECTION

I wish to call the attention of the readers of the QUARTERLY to an error in one numeral in Table III of my article on "Is the New Immigration More Unskilled than the Old?" which appeared in the June, 1919, issue of the QUARTERLY. This table, which, as stated, was taken from Volume I, page 174, of the report of the United States Immigration Commission, gives the number of skilled laborers from Southwestern Europe from 1899–1909 inclusive, as 804,920 out of a total immigration from these countries of 5,939,252. Due to some unaccountable slip in copying, however, the percentage derived from these figures was listed as 16.6 when as a matter of fact it should of course have been 13.6. Because of a misunderstanding between the editors of the QUARTERLY, I was not furnished with the proof of the article and thus had no opportunity of rechecking the figures and catching the mistake.

I am exceedingly sorry that this error crept into the table. It does not, however, vitiate the conclusion drawn; namely, that there is no marked difference in the percentage of skilled workmen in the "new" as contrasted with the "old" immigration, when these terms are properly defined. With the corrected percentage, 13.6 per cent of the total immigrants from Southeastern Europe from 1899 to 1909 inclusive, were skilled, while only 11.4 per cent of the total immigration from Northwestern Europe for the period 1871–82 were skilled.

PAUL H. DOUGLAS.

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